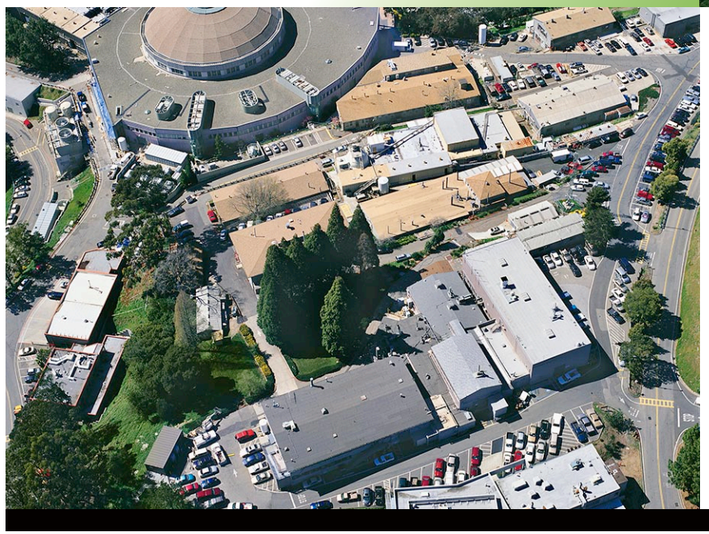
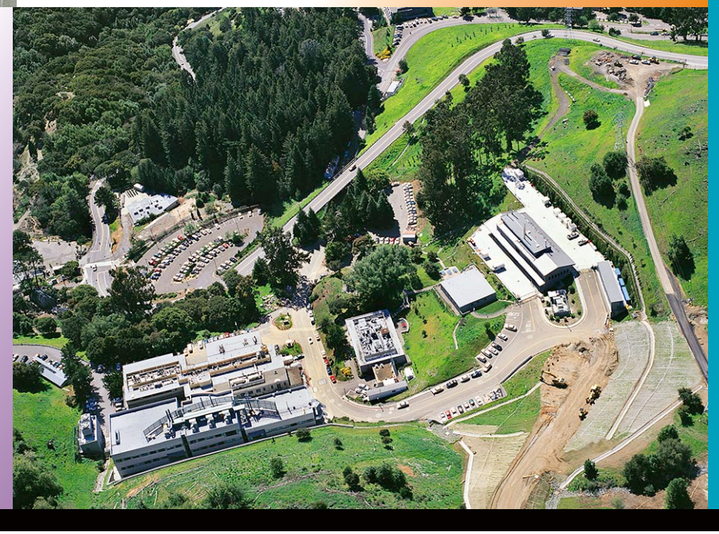
Lawrence Berkeley National Laboratory

Site-Wide Massing Study





Phase 1

JUNE 2009

Table of Contents

Study Objective

The Site-Wide Massing Study investigates development opportunities for future facilities, parking, pedestrian circulation, open space, and grading for four areas at the Lawrence Berkeley National Laboratory (LBNL):

Bevatron Area

Cafeteria Area

Old Town Area

Foundry-Bio Area

The study facilitates the laboratory's assessment of possible sites for pending research and programming scenarios – and the ability to determine timelines for site clean-up and usability, anticipate building phasing opportunities for movement of staff as well as functional adaptations (e.g. cafeteria), support development decisions based on informed investigation and thinking, and prepare presentations for Department of Energy (DOE) and UC Office of the President (UCOP) about the readiness of the laboratory site for future funding sources. This study is consistent with the Long Range Development Plan (LRDP) and the LRDP Environmental Impact Report (EIR).

Study Process

The two-month project schedule included three two-day on-site work sessions for the review of past planning documents and reviews by LBNL staff with expertise in planning, environmental impact, civil engineering, fire access, geotechnical, and specialized lab uses. Outputs from the collaborative work sessions include: (1) Site parameters and considerations for each study area; (2) Proposed building massing studies for the four study areas; and (3) Site-wide massing explorations that visually summarize the interrelationships of each study area to overall laboratory systems and functions. Work session dates and attendees follow.

Work Session Attendees

Overview

Monday 4-20-09

Fire Access Requirements	*Gary Piermattei, Fire Marshal*
BLASER Requirements	*Russell Wells, Engineer*

Tuesday 4-21-09

Progress Review	*Jim Krupnick, Chief Operating Officer* *Jennifer Ridgeway, Facilities Division Director*

Wednesday 4-22-09

Progress Review	*Paul Alivisatos, LBNL Director (interim)* *Chris Yetter, Chief of Staff* *Jennifer Ridgeway, Facilities Division Director* *Jerry O'Hearn, Facilities Design & Construction* *Sheree Swanson, Facilities Project Manager* *Jeff Philliber, Facilities Environmental Planner*

Monday 5-4-09

Utilities, Roadways, Seismic	*Fred Angliss, Structural Engineer* *Steve Blair, Civil Engineer*
Fire Code Issues	*Gary Piermattei, Fire Marshal* *Janice Cheung, Deputy Fire Marshal*

Tuesday 5-5-09

Shuttle Services	*Tammy Brown, Shuttle Services*
Environmental Planning	*Jeff Philliber, Facilities Environmental Planner*

The Site-Wide Massing Study was directed by *Laura Chen, Chief Facilities Planner.*

Site Planning Principles

The following site planning principles apply to the four study areas. They should be extrapolated to future development of the entire laboratory site.

Create a world-class lab environment by...

- Attracting international researchers with stellar facilities and a beautiful environment
- Creating development opportunities to highlight and support emerging energy research
- Demonstrating lab innovations in energy-efficient technology
- Developing sustainable land use and circulation patterns
- Maximizing bicycling, pedestrian, and shuttle services
- Minimizing visually intrusive parking

Encourage collaboration by...

- Enabling cross-pollination between disciplines
- Supporting global partnerships
- Creating collaborative outdoor spaces between buildings and on rooftop gardens

Plan for flexibility by...

- Offering a variety of new building sites that are adaptable to a range of program needs
- Optimizing infrastructure and facilities for change

Use the land wisely by...

- Redeveloping brownfield sites first
- Considering only greenfields immediately adjacent to already developed areas
- Maximizing density to reduce overall building footprint and to maximize connections between occupants
- Working with the terrain
- Minimizing heat-island effect and stormwater runoff by reducing impervious surfaces, such as surface parking
- Conserving open space

Thoughtfully orient buildings to...

- Maximize opportunities for use adjacencies
- Clearly orient users and visitors
- Optimize energy efficiency
- Maximize shared views
- Be sensitive to neighbors' views into the site

Facilitate pedestrian movement through...

- ADA accessible grade-level connections
- Vertical connections via buildings and parking structures
- Pedestrian bridges

The following criteria guided the site massing studies. These "starting points" will evolve as LBNL undertakes further programming, site study, and costing.

Buildings

- 18 feet floor-to-floor
- 75 feet maximum height from ground to highest finished floor elevation (additional height affects costs due to fire code requirements)
- Partial basements for buildings sited in hillsides

Parking Structures

- 10 feet level-to-level
- Natural ventilation (50% of perimeter exposed to outside)

Vehicular

- 10% maximum slope

Fire Access

- No turnaround required for 0- to 150-foot long road access
- Turnaround (120-foot hammerhead, 60-foot "Y", or 96-foot diameter cul-de-sac) required for 151- to 500-foot long road access
- Minimum road width of 20 feet; 26 feet where fire hydrant hook-ups are located
- Fire truck turning movement requires 48-foot outside radius; 28-foot inside radius
- Case-by-case review by fire marshal required where "150-foot" guidelines are not achievable; potential solutions include use of horizontal stand pipes

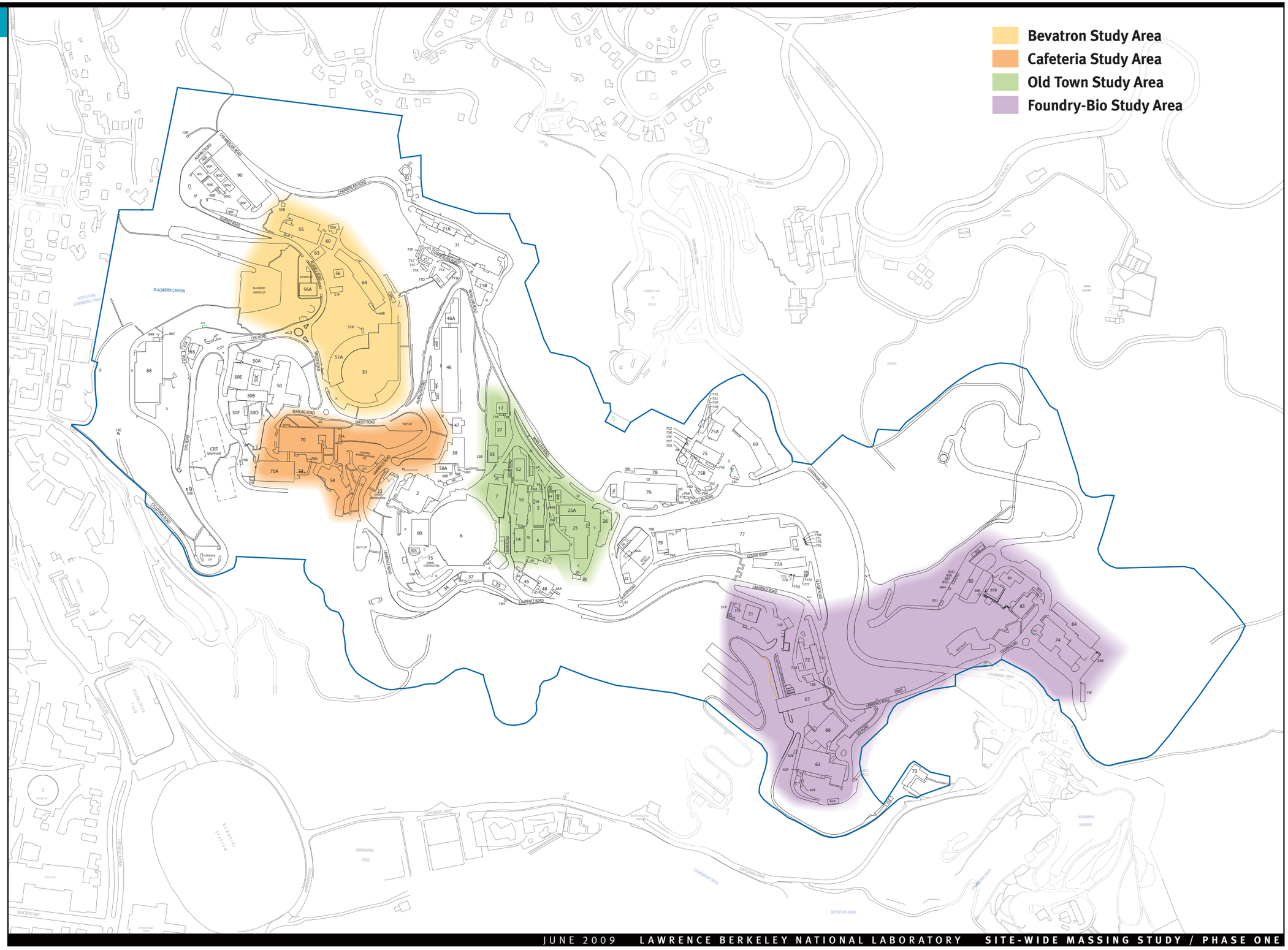
Additional Considerations

Altering the guidelines above can affect capacities and costs. For example, the 18 foot floor-to-floor dimension is conservatively high. This may be reduced to 14 feet for lab use or could be reduced to 12 feet if the floor is entirely devoted to offices or other uses. Such reductions could increase a building's capacity wthout significantly increasing square-foot costs by allowing an additional floor while not exceeding 75 feet to the highest floor. The lab might consider the following strategies to increase capacity:

- Separating labs and offices onto different floors, so that office floors can benefit from reduced ceiling heights
- Increasing building height beyond 75 feet (highest finished floor elevation)
- Building basements fully below grade
- Building parking levels below grade (mechanically ventilated)

1.4

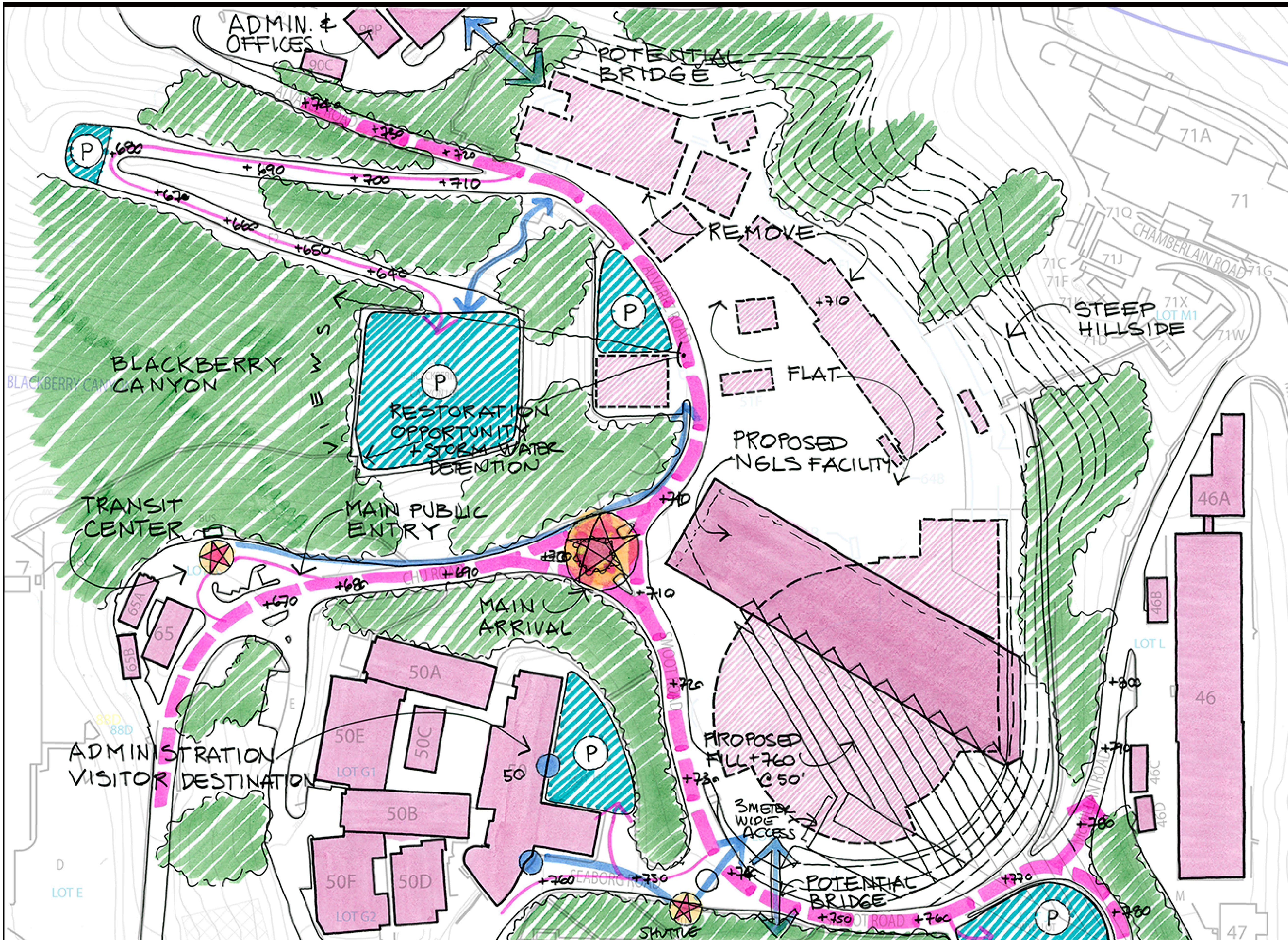
Study Areas



Bevatron Study Area

Planning Considerations

The Bevatron site provides most visitors with their first impression of the Lab. The large, flat site—an anomaly on the steep hillside campus—presents the Lab with a major opportunity for new development.

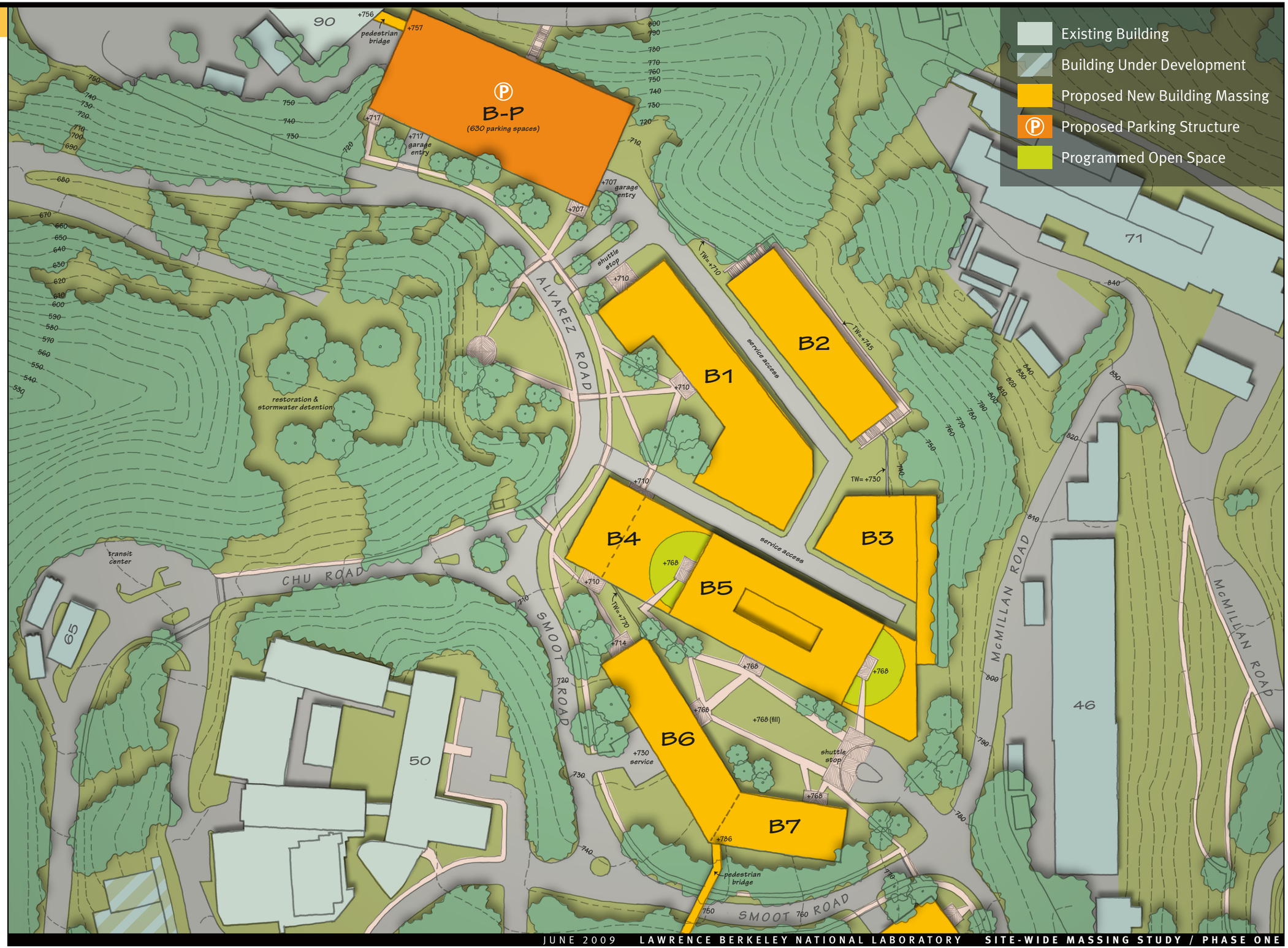


2.2

Bevatron Study Area

Site Massing

New buildings frame open spaces with views of Blackberry Canyon. A parking structure at the north end of the site creates a vertical connection to Building 90. Fill needed for the *Berkeley Laser Array for Science and Energy Research (BLASER)* project brings the grade at the south end up to Smoot Road. Both improve pedestrian connectivity to surrounding areas by bridging grade changes.



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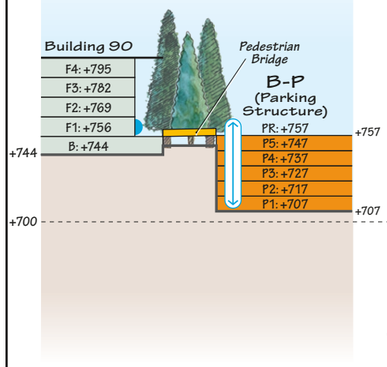

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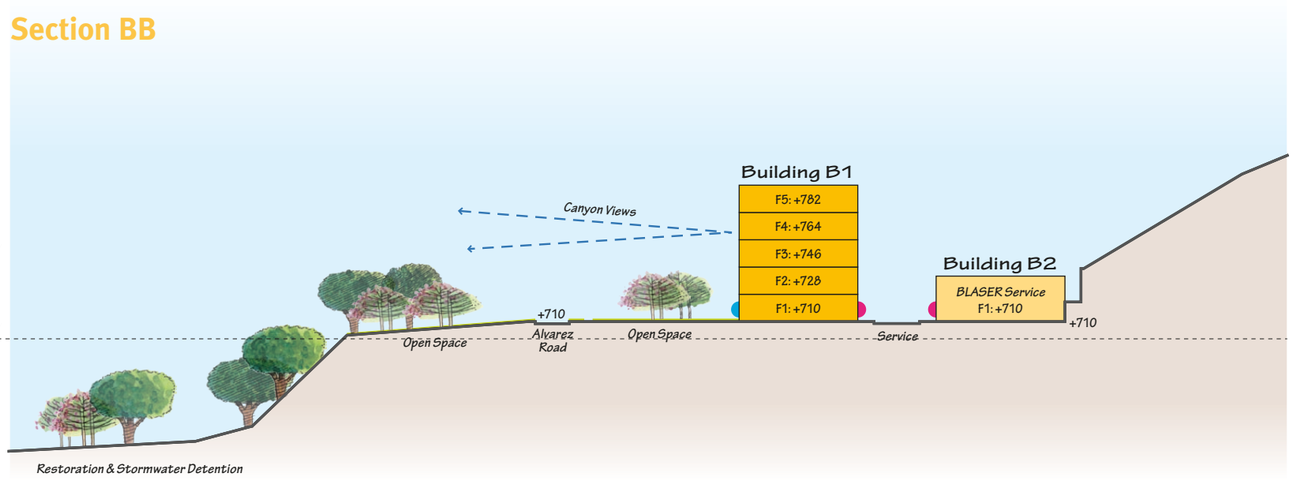

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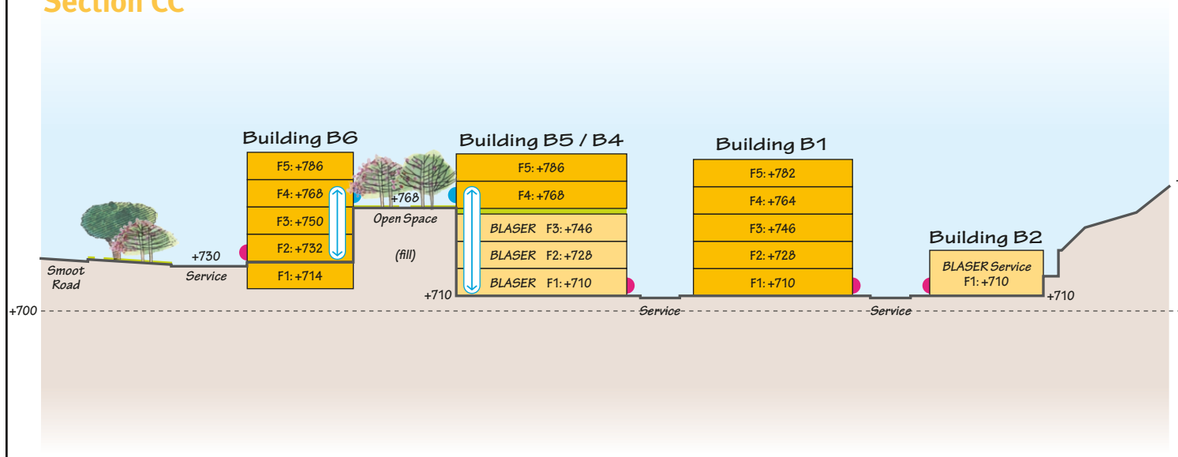

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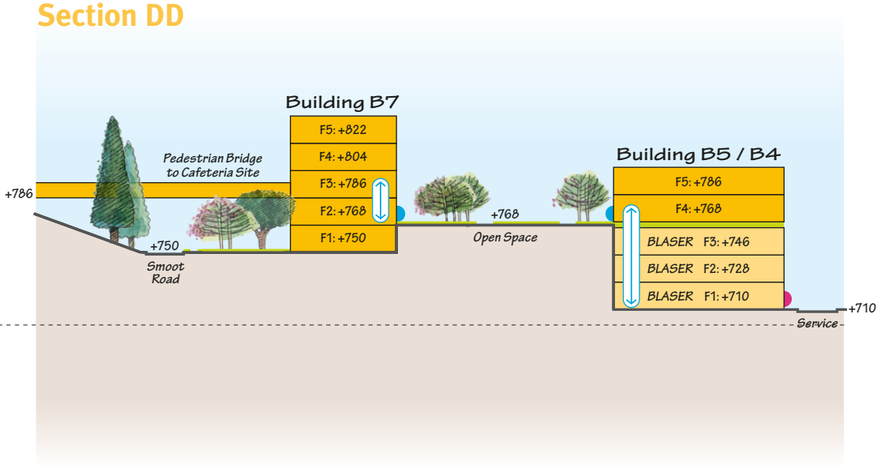
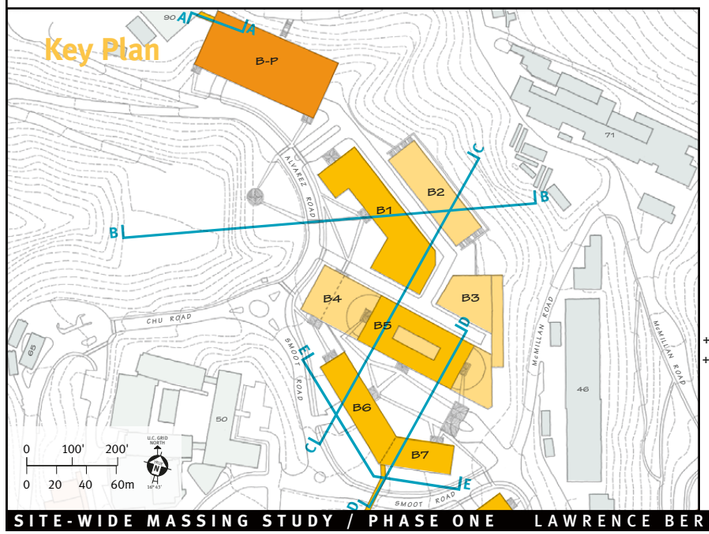


Key Plan



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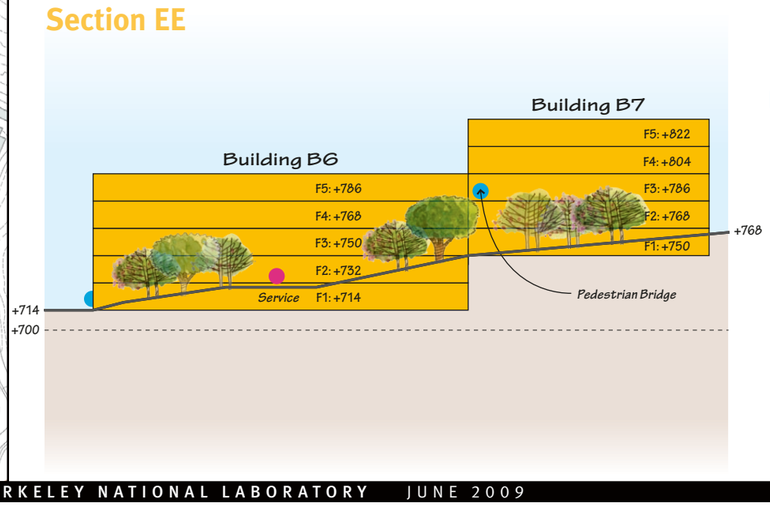


- Building entry
- Service access
- Vertical connection through building

Bevatron Study Area

Section Views

Assumptions

- Implementation of the *BLASER* facility per the concept drawing dated April, 2009
- *BLASER* service buildings (B2 and B3) need to stand alone and against the hillside; i.e. no additional floors or other uses can be added above
- *BLASER* will place 30 feet of fill in southeast area of the study area (marked *fill* on plan)

0 50' 100'
0 10 20 30m

2.4

Bevatron Study Area

Site Diagrams

A. Grading

B. Open Space

C. Pedestrian Circulation & Shuttle Stops

D. Vehicular Circulation

U.C. GRID NORTH

TRUE N

16° 43'

0 100' 200'

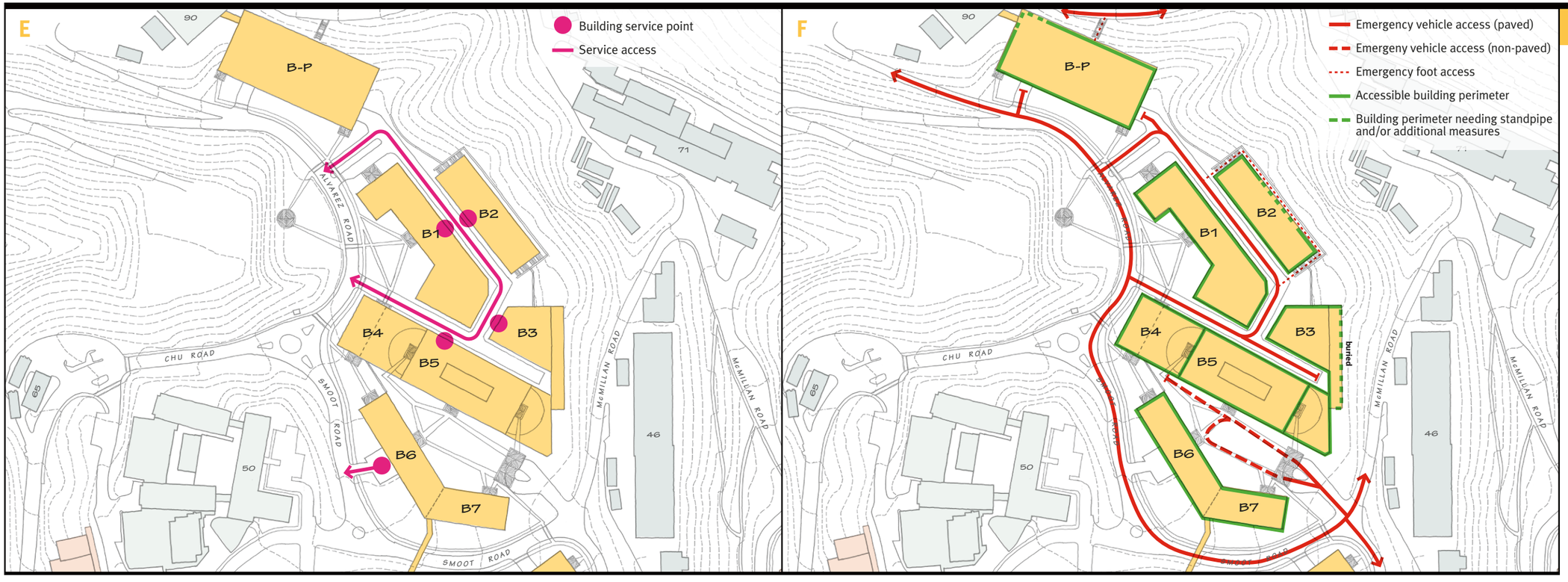
0 20 40 60m

Bevatron Study Area

Site Diagrams

E. Service Access

F. Emergency Access



U.C. GRID NORTH

TRUE N

16° 43'

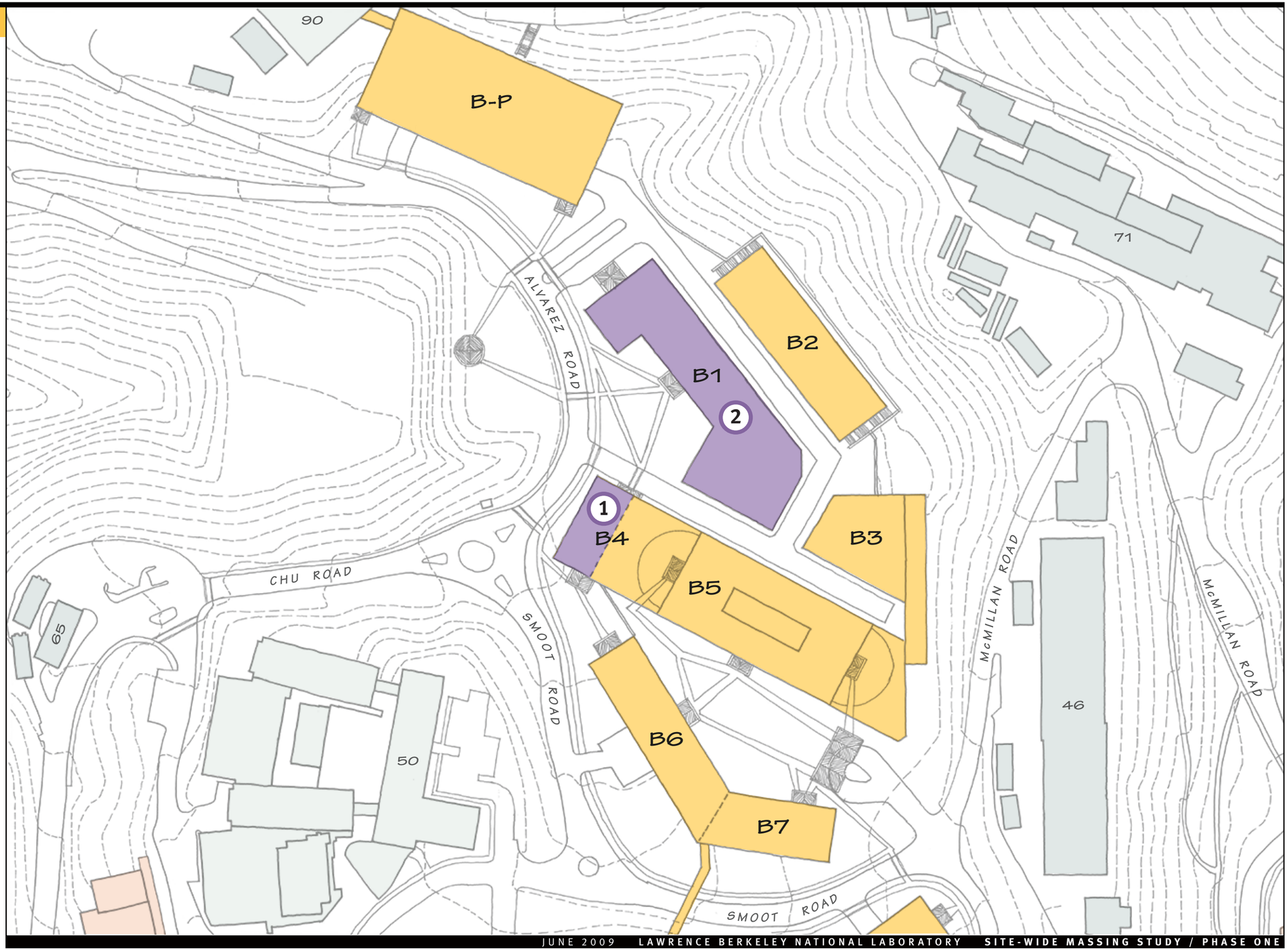
0 100' 200'

0 20 40 60m

Bevatron Study Area

Further Planning Considerations

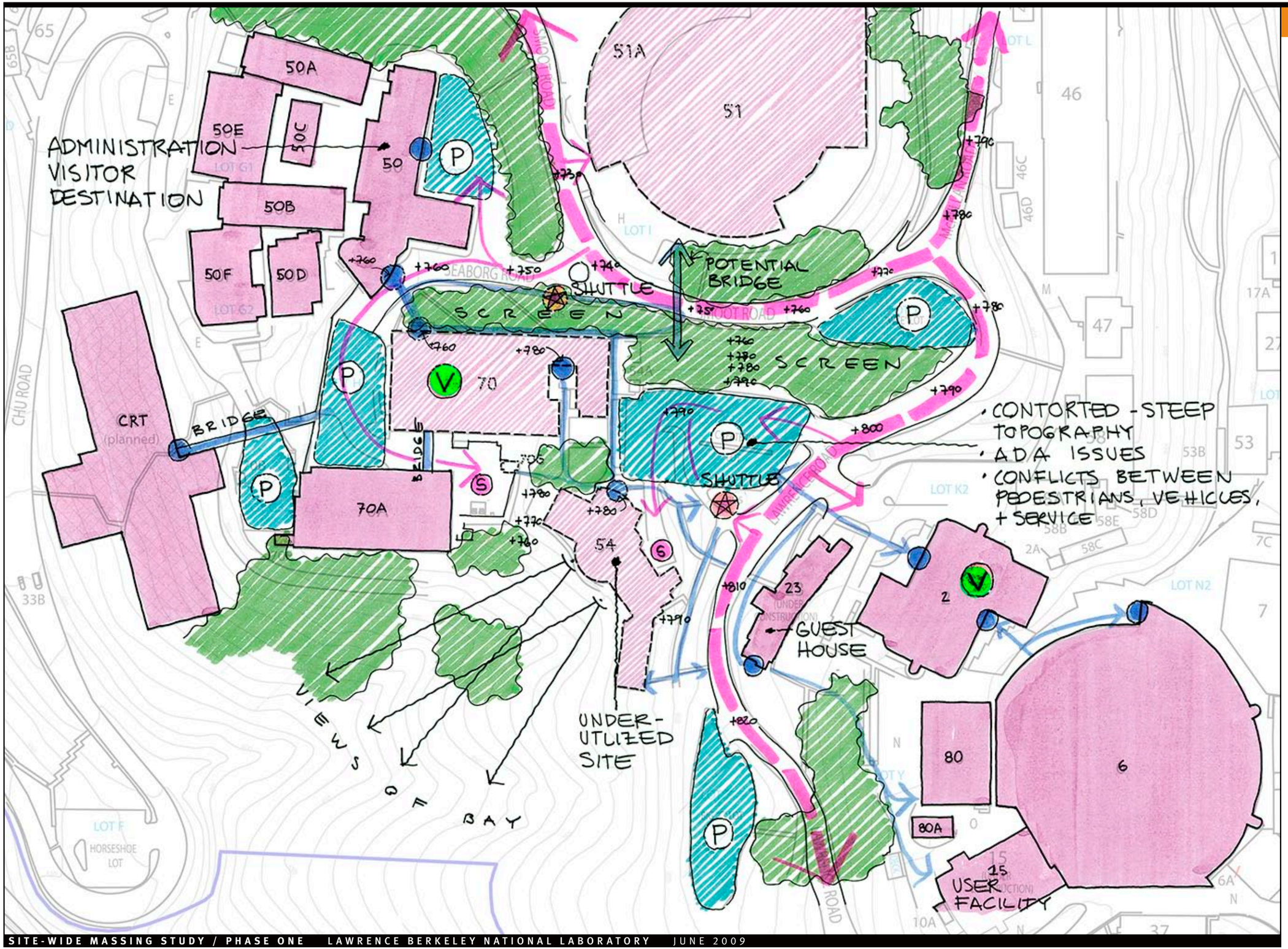
1. *BLASER* Building B4 is too close to intersection at campus main public entry; investigate if building can be shortened or moved back by 50 feet
2. Building B1 may be too tall (may be visible from city); if *BLASER* service functions in B2 do not need to stand alone, add floors to B2 and reduce the height of B1
3. Develop an alternative assuming off-site location for *BLASER (not shown)*



Cafeteria Study Area

Planning Considerations

The Cafeteria site is the heart of the Lab: it is the meeting place for all employees and visitors. The existing cafeteria, however, is aging and close to capacity.

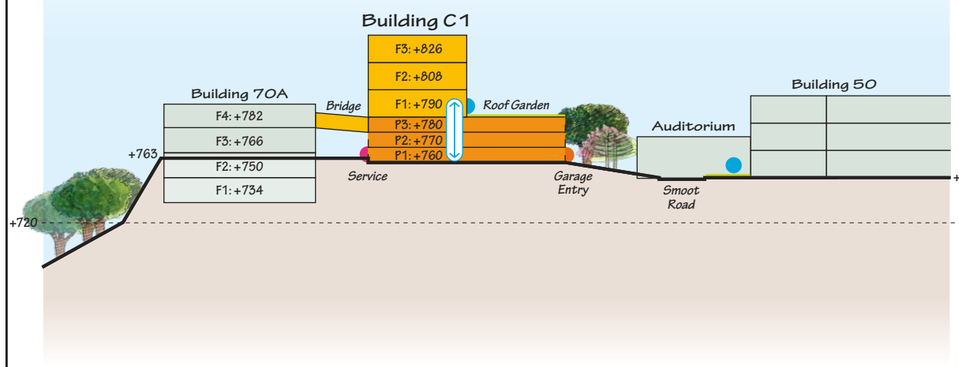


Cafeteria Study Area

Site Massing

Building C3 allows the phased replacement of the cafeteria on its current site, retaining its central location and panoramic views. The cafeteria spills out onto a new "campus quad" that provides space for Lab-wide social events. This new open space utilizes fill to resolve ADA accessibility. By relocating service and parking functions to peripheral areas, the plan creates a truly pedestrian-oriented heart to the campus. In addition to serving the Cafeteria site, a parking structure beneath Building C1 serves both the B50 Complex and the proposed *Computational Research and Theory (CRT)* building, creating vertical pedestrian connections to these areas.

Section AA



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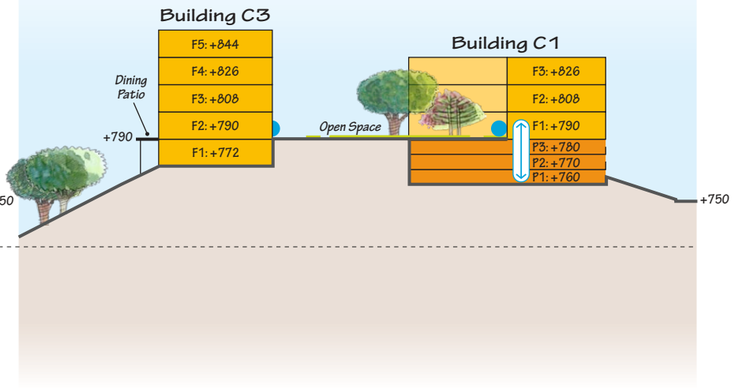

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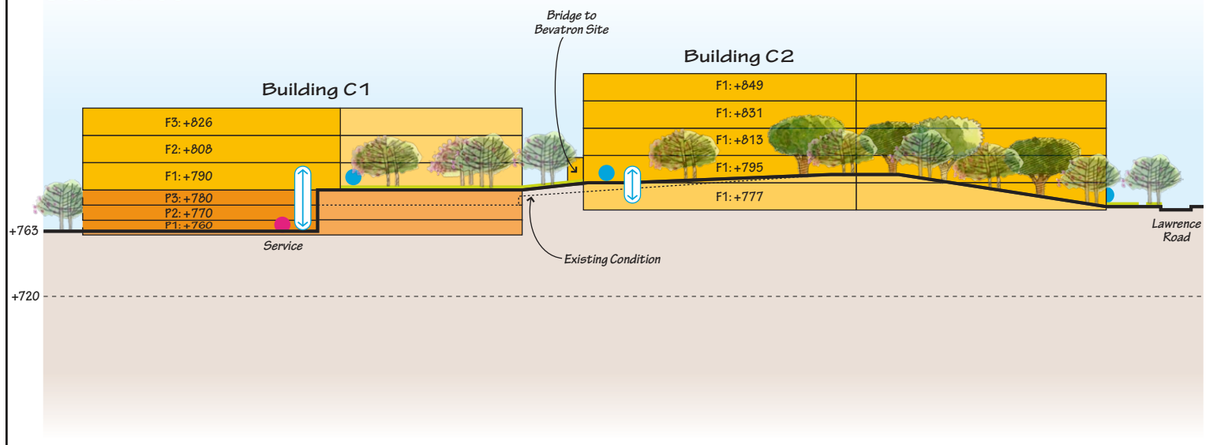
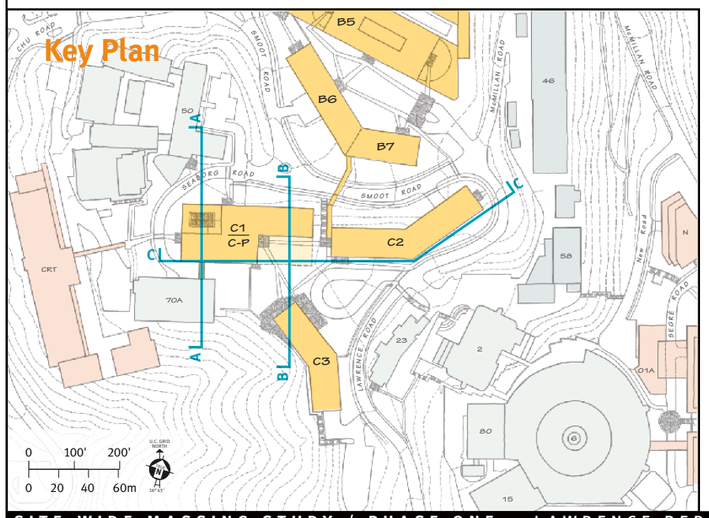




- Building entry
- Service access
- Vertical connection through building

Cafeteria Study Area

Section Views

Assumptions

- The cafeteria study area is the social-meeting hub of the Lab; it needs to include an open space to accommodate large campus-wide events
- Phased development of Building C3, which will house a new cafeteria, will allow the existing cafeteria to function during construction
- In order to house existing occupants of Building 70, Building C2 will be finished before construction of C1 commences

0 50' 100'
0 10 20 30m

3.4

Cafeteria Study Area

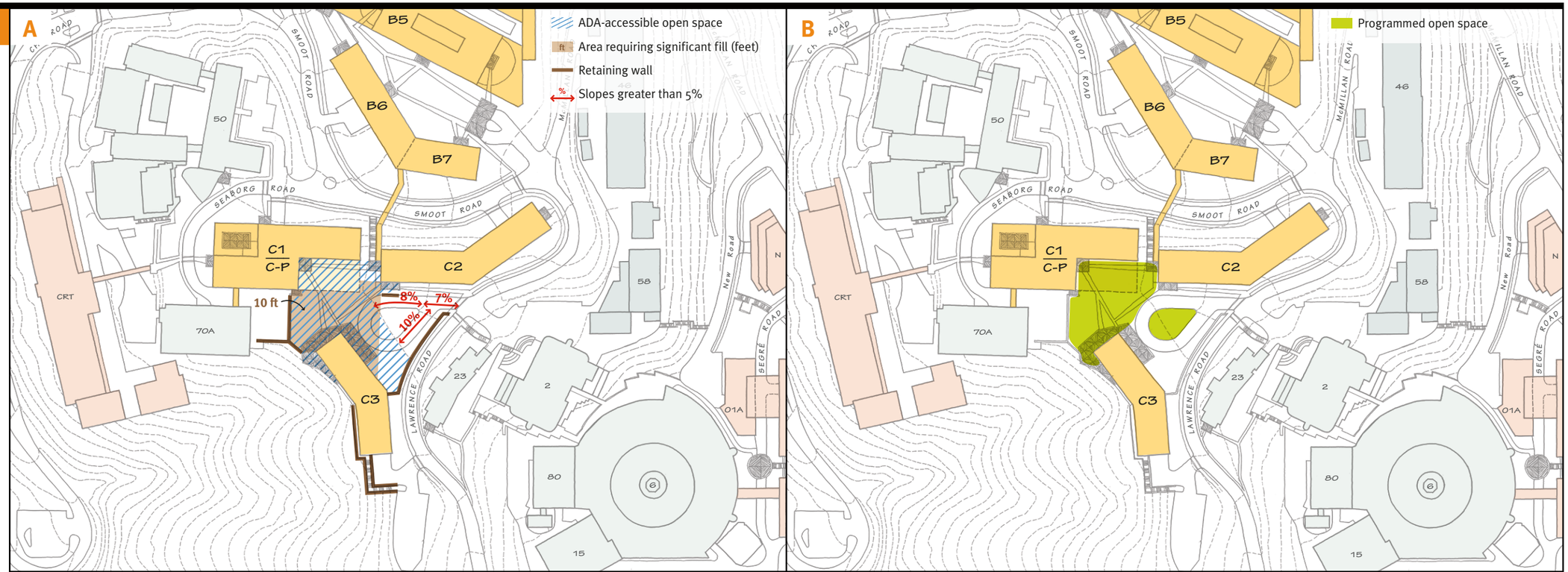
Site Diagrams

A. Grading

B. Open Space

C. Pedestrian Circulation & Shuttle Stops

D. Vehicular Circulation



U.C. GRID NORTH

TRUE N

16° 43'

0 100' 200'

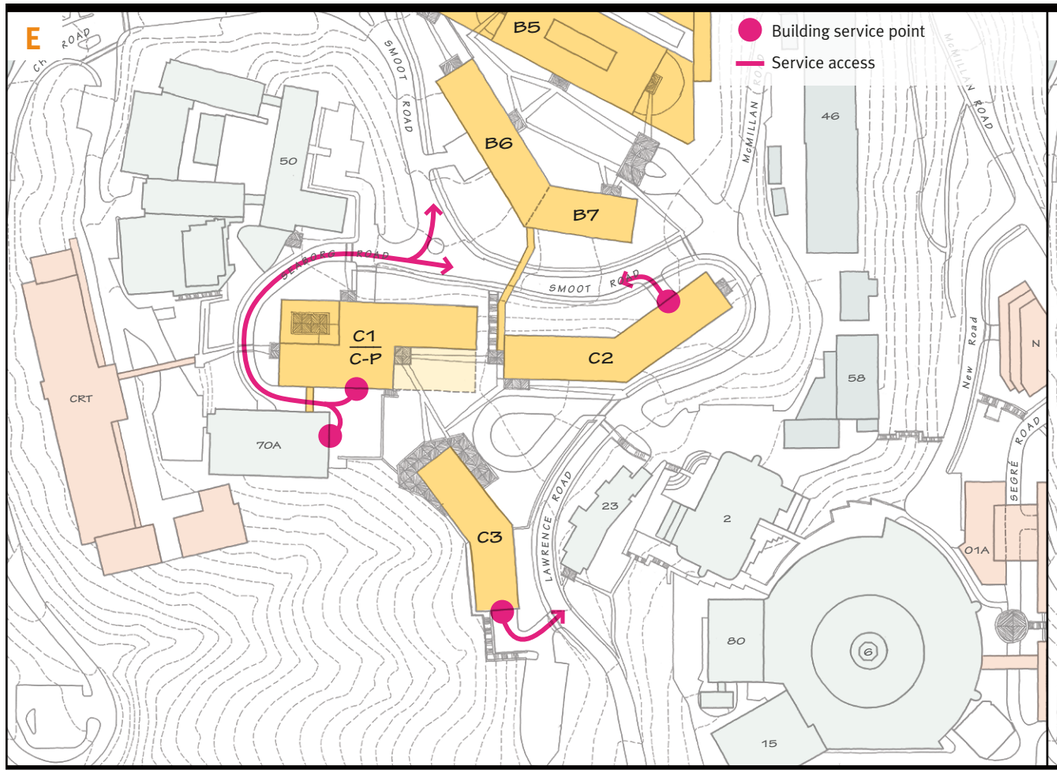
0 20 40 60m

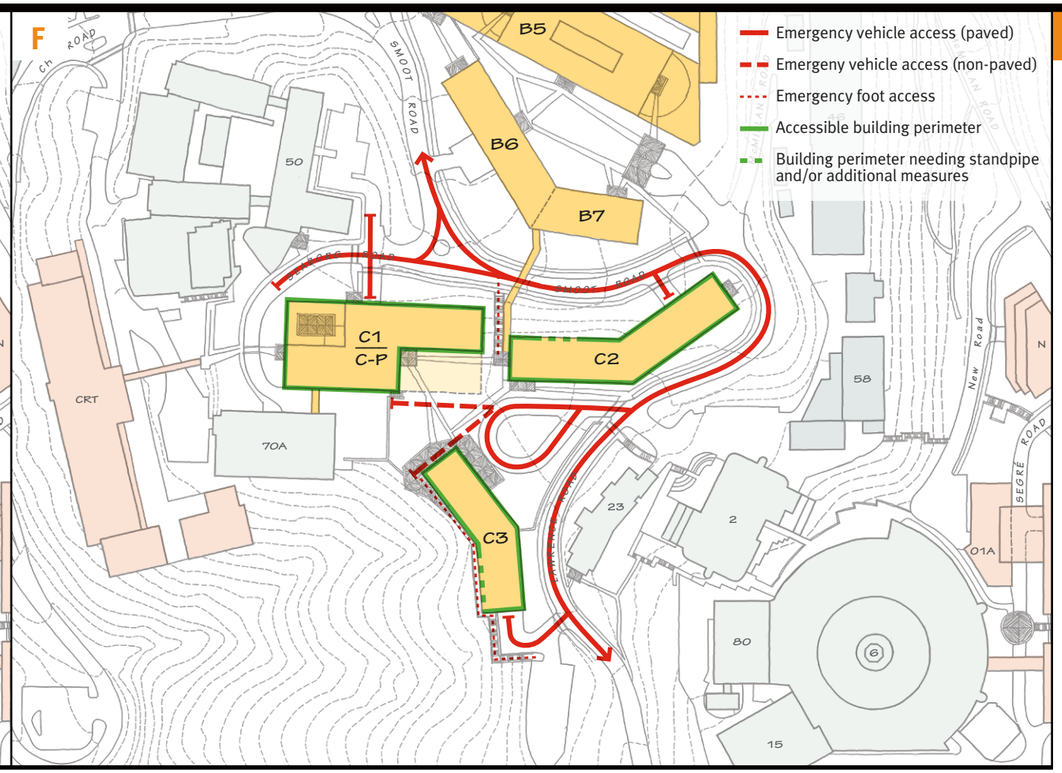
Cafeteria Study Area

Site Diagrams

E. Service Access

F. Emergency Access





U.C. GRID NORTH

TRUE N

16° 43'

0 100' 200'

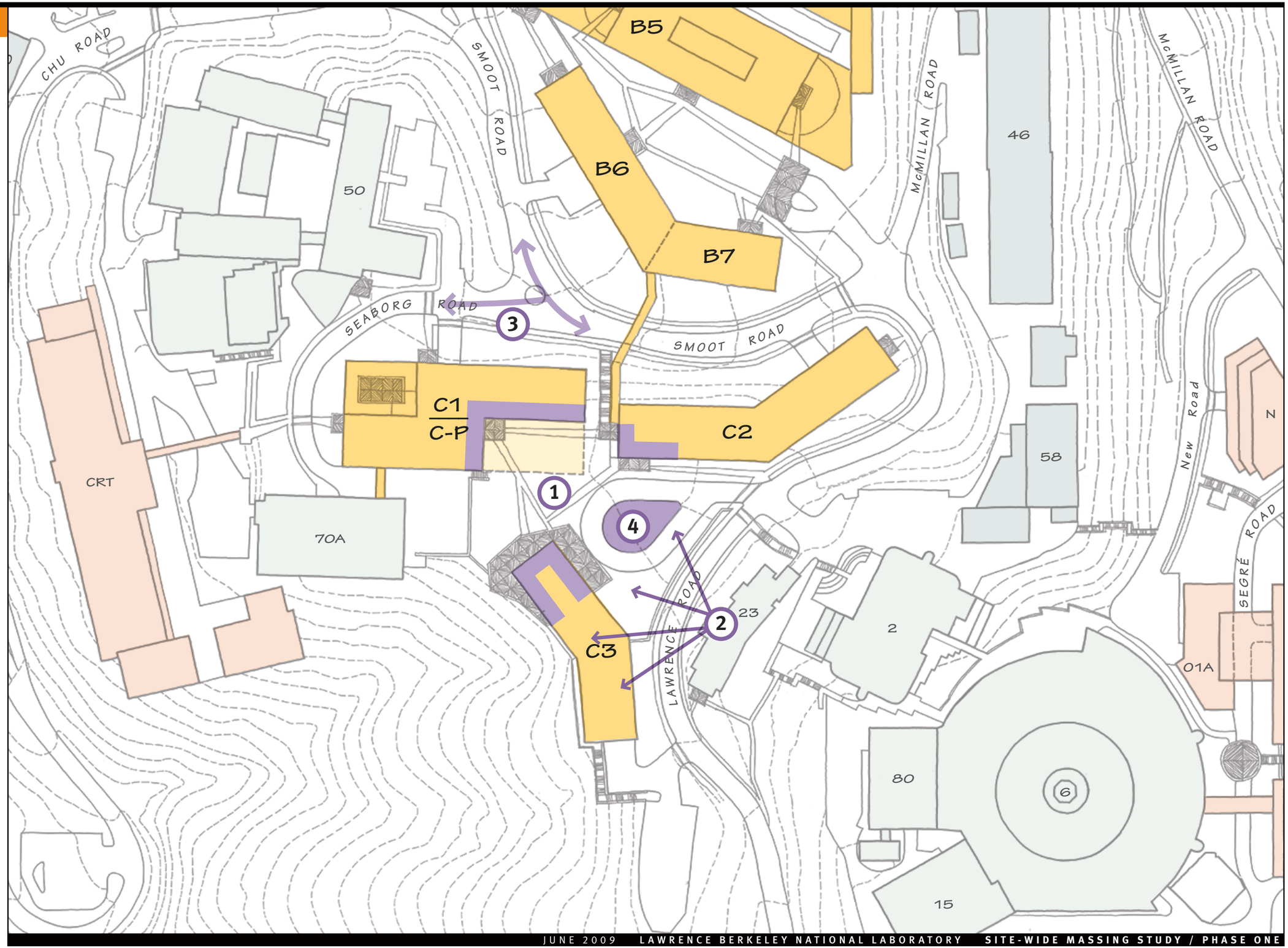
0 20 40 60m

3.6

Cafeteria Study Area

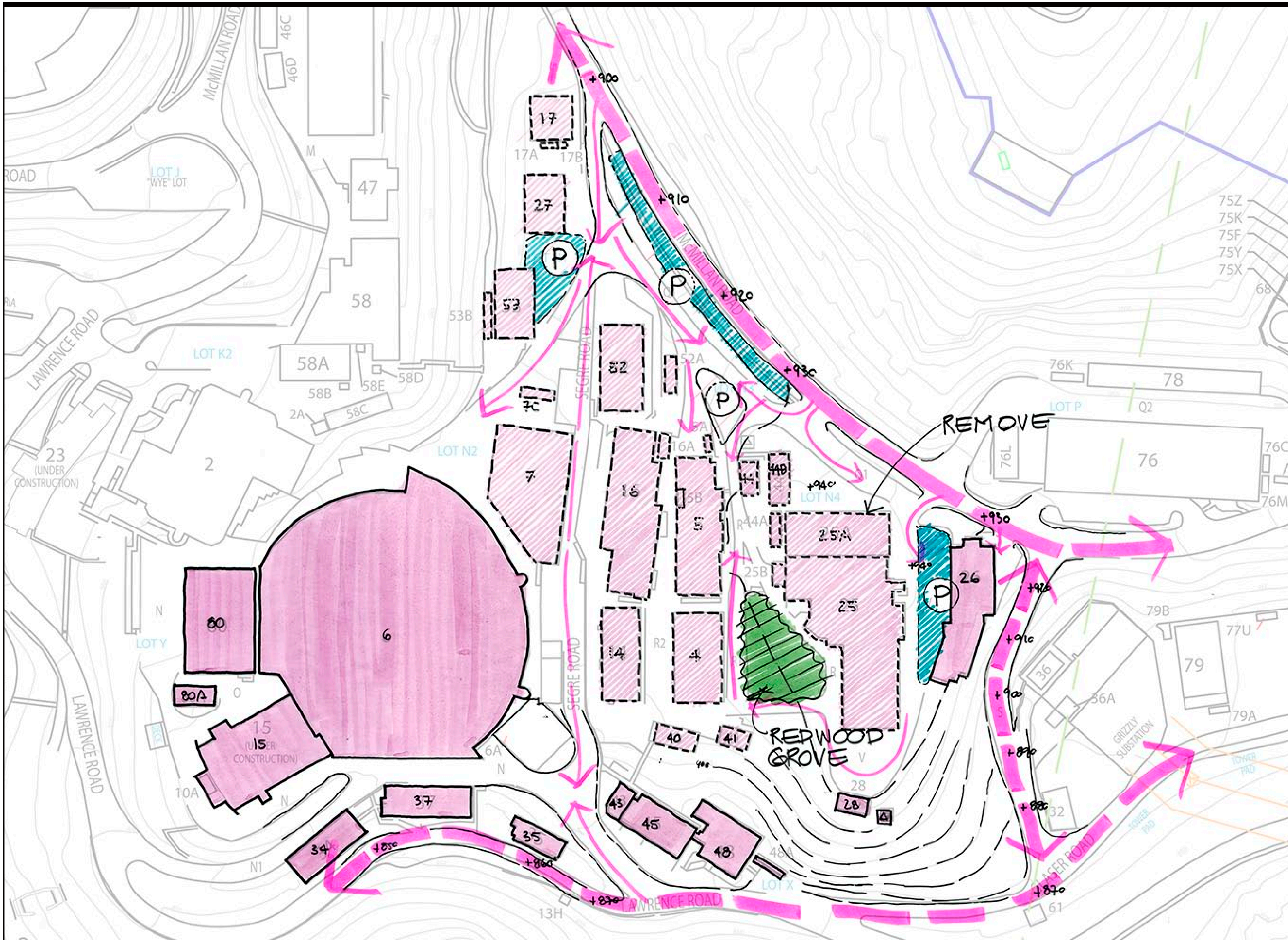
Further Planning Considerations

1. Ground floor uses surrounding open space should be accessible and active (avoid blank walls)
2. Further analyze views from guest house with respect to future development
3. Consider reconfiguring roundabout to the north of Building C1 (existing Building 70) to a “T” intersection in order to clarify wayfinding to C-P parking structure and Building 50
4. Interior of shuttle turnaround could serve as informal grassy amphitheater



U.C. GRID NORTH
TRUE N
16° 43'

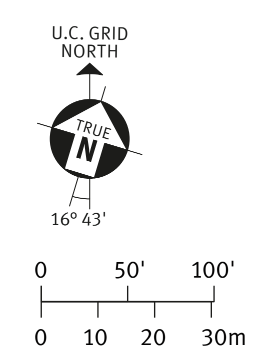
0 50' 100'
0 10 20 30m



Old Town Study Area

Planning Considerations

The Old Town site massing plan amends the Old Town Site Massing Study (Perkins Design Associates) from August 2001 (shown on page 4.6). The need for environmental remediation requires a plan that is easily phased.



4.2

Old Town Study Area

Site Massing

This site massing locates two 45,000-square-foot buildings on the eastern portion of the site. These two buildings are sited to relate to the buildings proposed in the 2001 Site Massing Study. Surface parking allows fire access to the site.

U.C. GRID NORTH

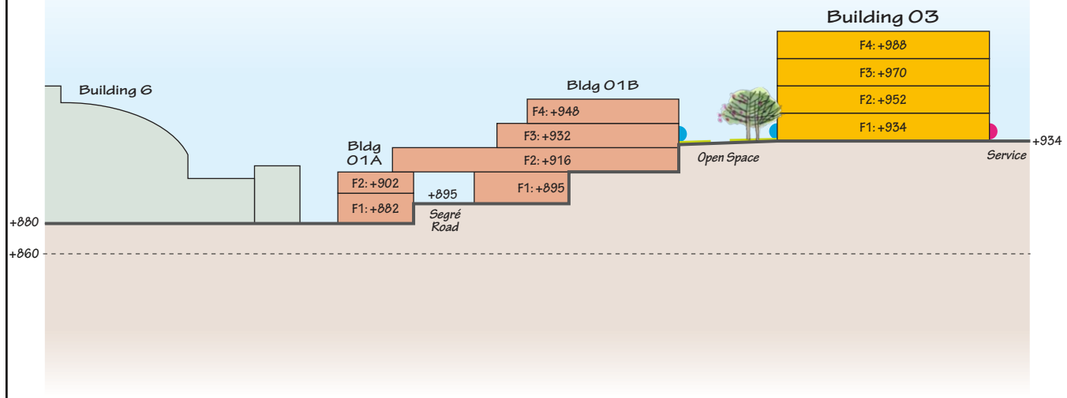
TRUE N

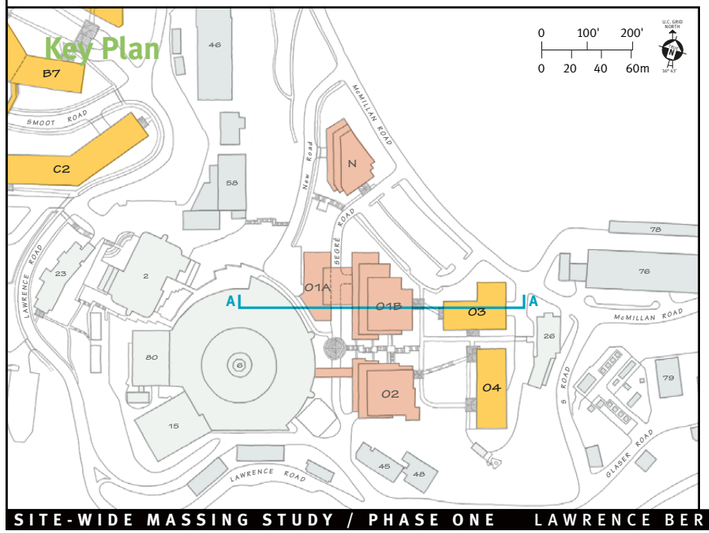
16° 43'

0 50' 100'

0 10 20 30m

Section AA





- Building entry
- Service access
- Vertical connection through building

Old Town Study Area

Section Views

Assumptions

- Accept as given the 2001 Old Town Site Massing Study, with the addition of Buildings 03 and 04 (45,000 GSF each) on the sites of existing Buildings 25 and 25A, to accommodate immediate programmatic needs
- In order to fit Building 03, the parking deck shown in the 2001 Site Massing Study has been reduced to a smaller surface lot
- This study area was not subjected to the same analysis as the other three study areas

0 50' 100'
0 10 20 30m

Old Town Study Area

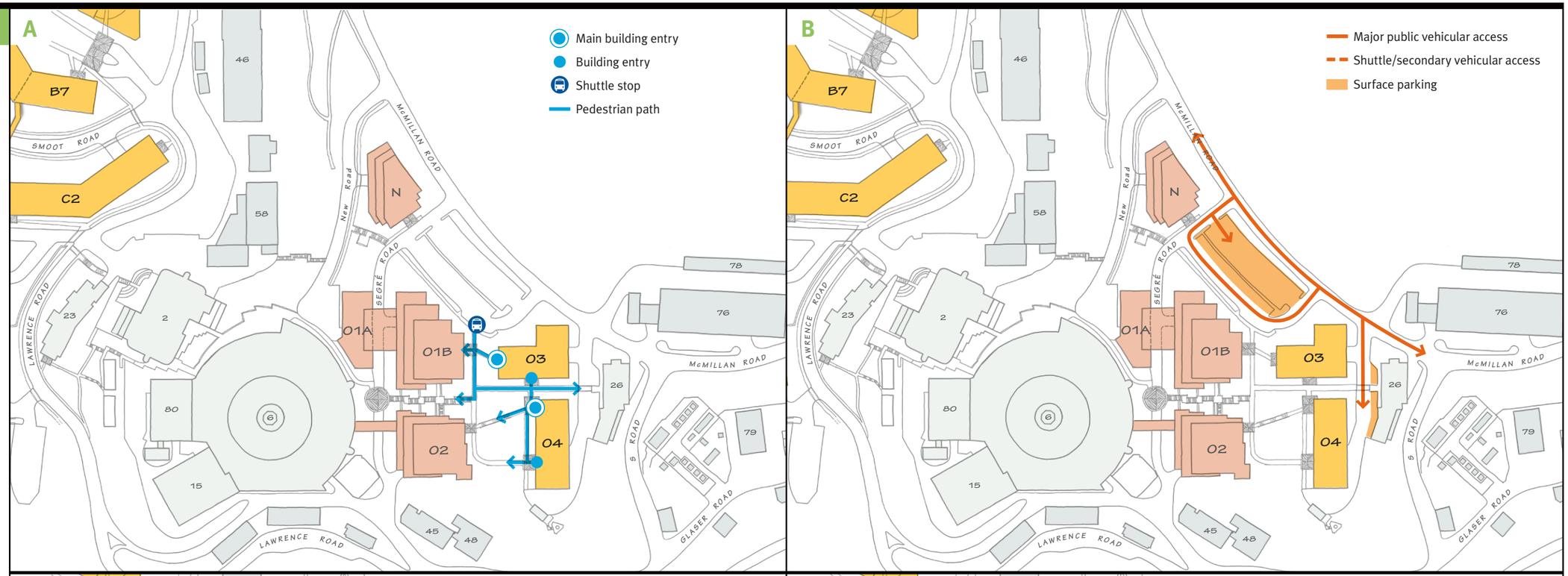
Site Diagrams

A. Pedestrian Circulation & Shuttle Stops

B. Vehicular Circulation

C. Service Access

D. Emergency Access



U.C. GRID NORTH

TRUE N

16° 43'

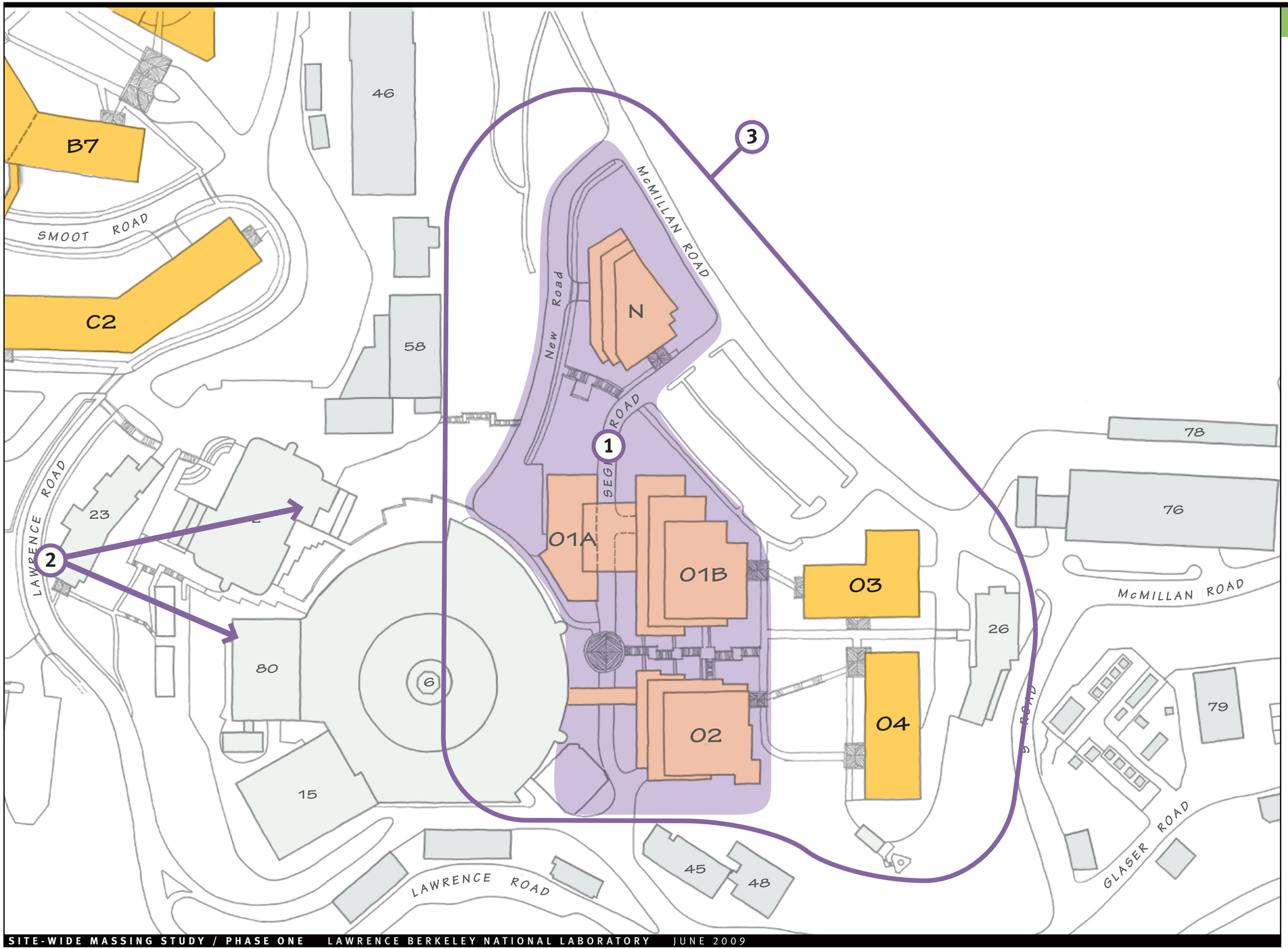
0 100' 200'

0 20 40 60m

Old Town Study Area

Further Planning Considerations

1. 2001 Site Massing Study needs further testing regarding grading, circulation, and access
2. Analyze views of the areas directly behind Building 6 as seen from the city of Berkeley and from the Lawrence Hall of Science
3. The entire site should be reconsidered in an integrated study including parking, pollution remediation, phasing, and the latest programmatic requirements



SITE-WIDE MASSING STUDY / PHASE ONE LAWRENCE BERKELEY NATIONAL LABORATORY JUNE 2009

Old Town Study Area

Reference:
2001 Old Town Massing Study
(Perkins Design Associates)

U.C. GRID NORTH
TRUE N
16° 43'

0 50' 100'
0 10 20 30m

Foundry-Bio Study Area

Planning Considerations

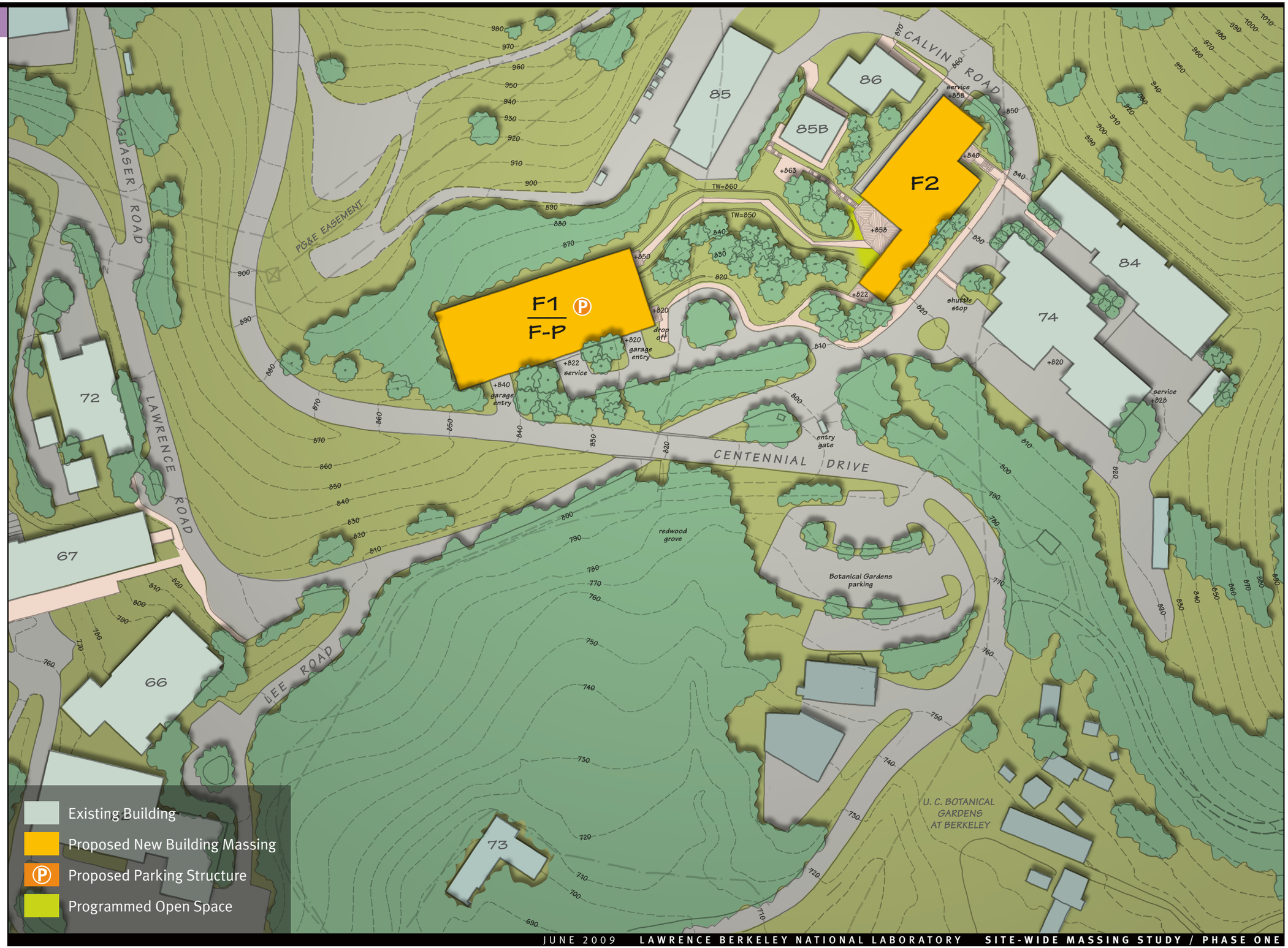
The Foundry-Bio site is remote from the rest of the campus. New development will be focused near the existing Bio buildings (74 & 84) to accommodate programmatic relationships.

5.2

Foundry-Bio Study Area

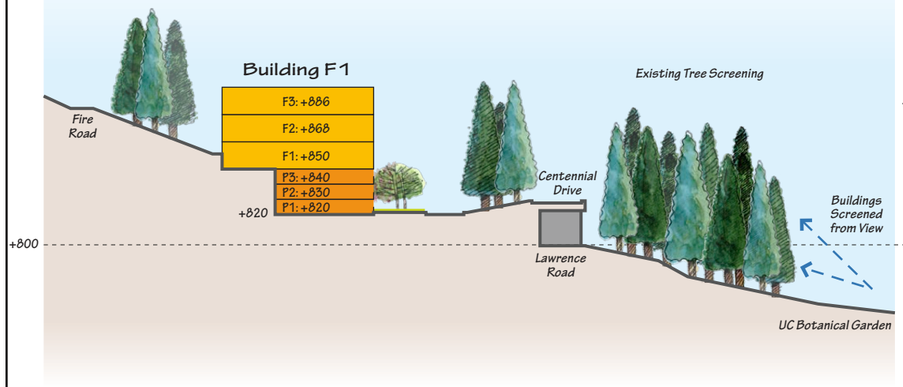
Site Massing

The proposed building locations avoid impacting sensitive views from the City of Berkeley and the Botanical Gardens at UC Berkeley. The siting preserves the existing natural open space between the two proposed new buildings (F1 & F2), with paths providing ADA-accessible pedestrian connections.



JUNE 2009 LAWRENCE BERKELEY NATIONAL LABORATORY SITE-WIDE MASSING STUDY / PHASE ONE

Section AA



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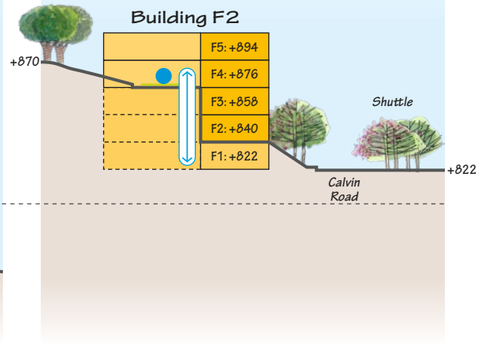

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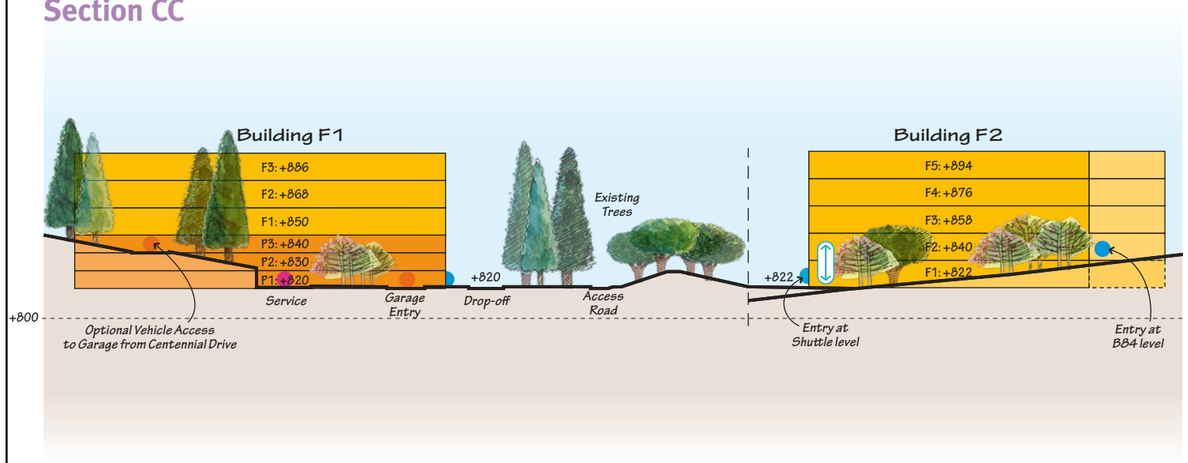
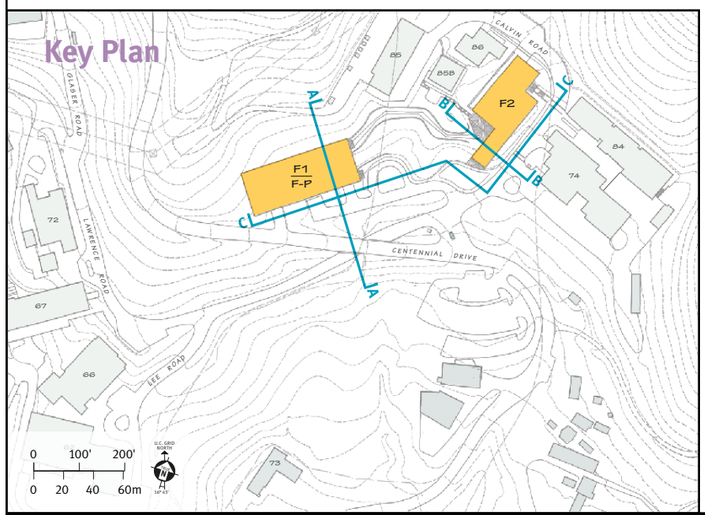


Key Plan



- Building entry
- Service access
- Vertical connection through building

Foundry-Bio Study Area

Section Views

Assumptions

- Lab program requires siting of two buildings at 100,000 GSF each
- Proposed program for new development has relationship to programs in Buildings 74 and 84
- Optional public vehicular access from Centennial Drive is desirable (for one of these buildings)

0 50' 100'
0 10 20 30m

5.4

Foundry-Bio Study Area

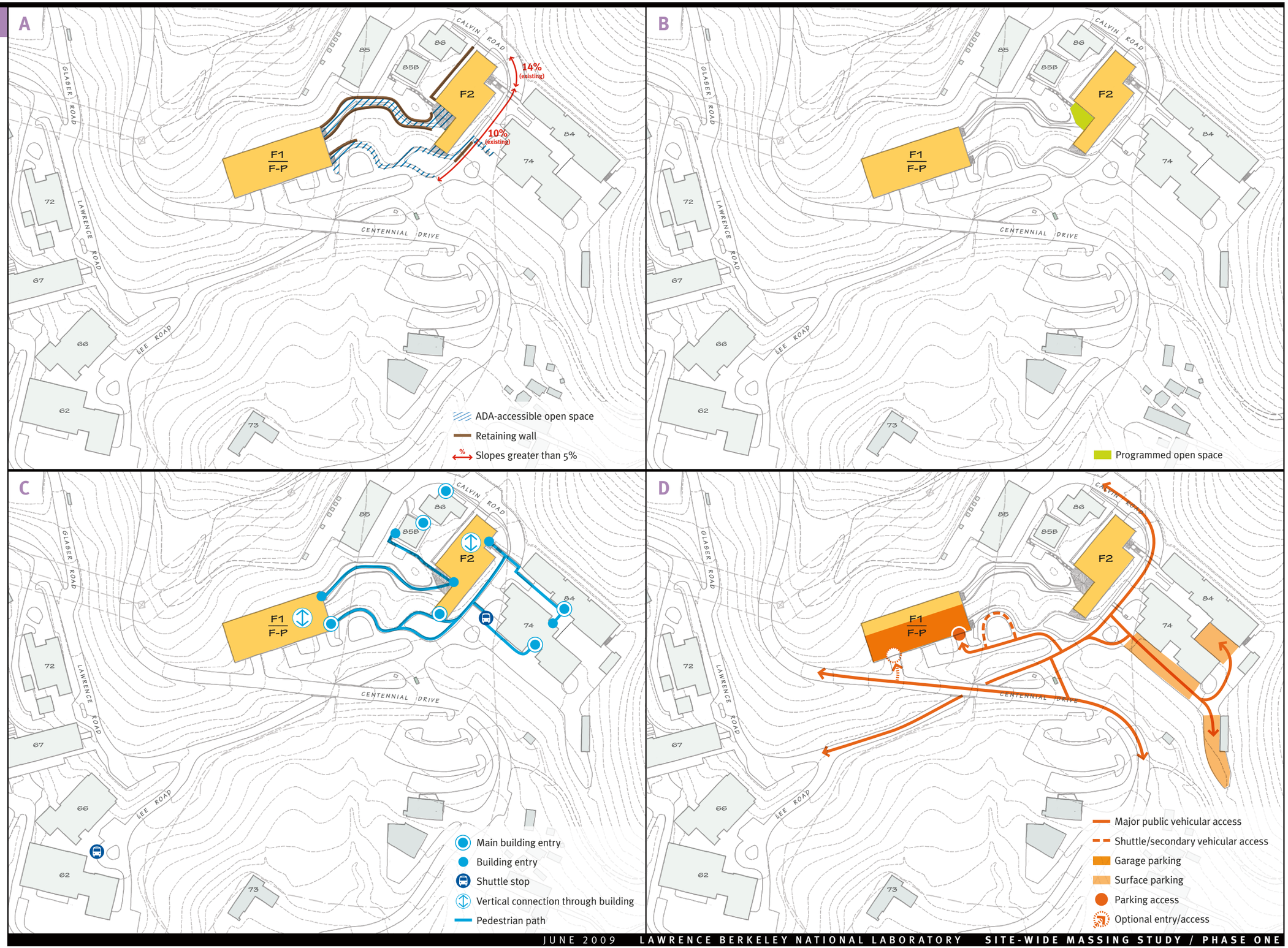
Site Diagrams

A. Grading

B. Open Space

C. Pedestrian Circulation & Shuttle Stops

D. Vehicular Circulation



U.C. GRID NORTH

TRUE N

16° 43'

0 100' 200'

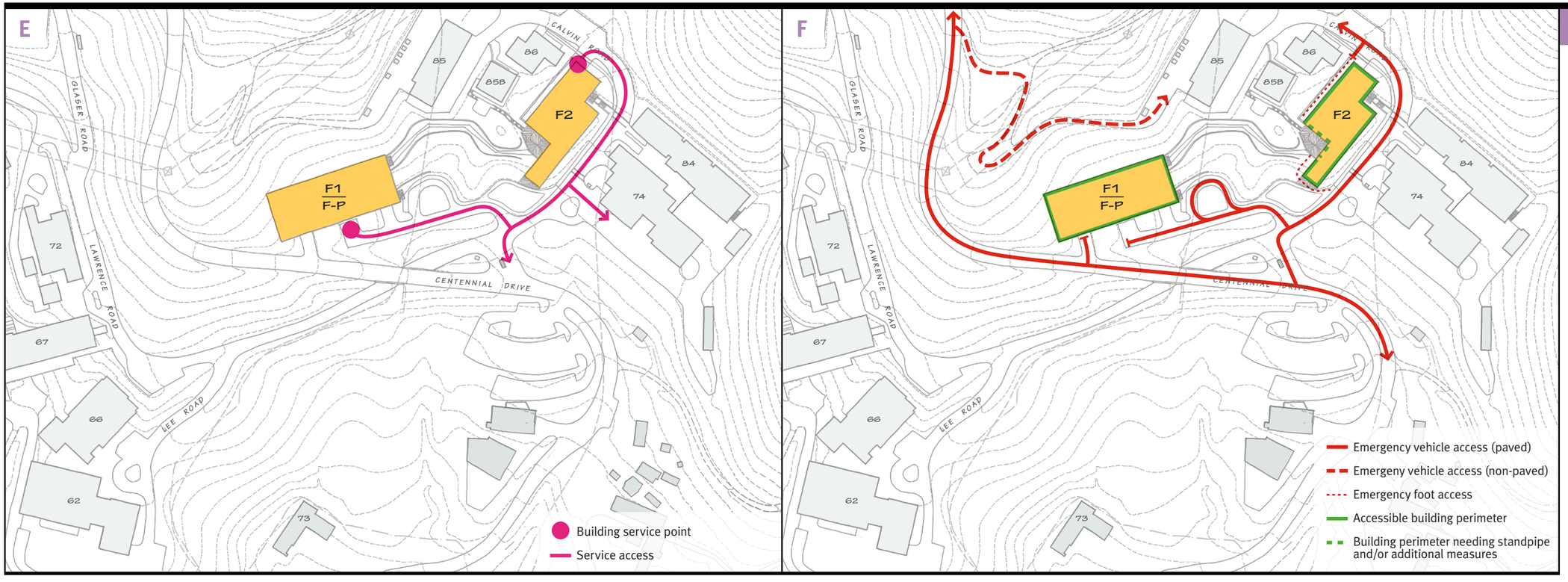
0 20 40 60m

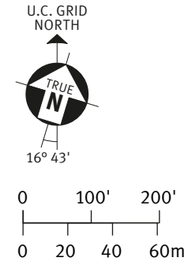
Foundry-Bio Study Area

Site Diagrams

E. Service Access

F. Emergency Access

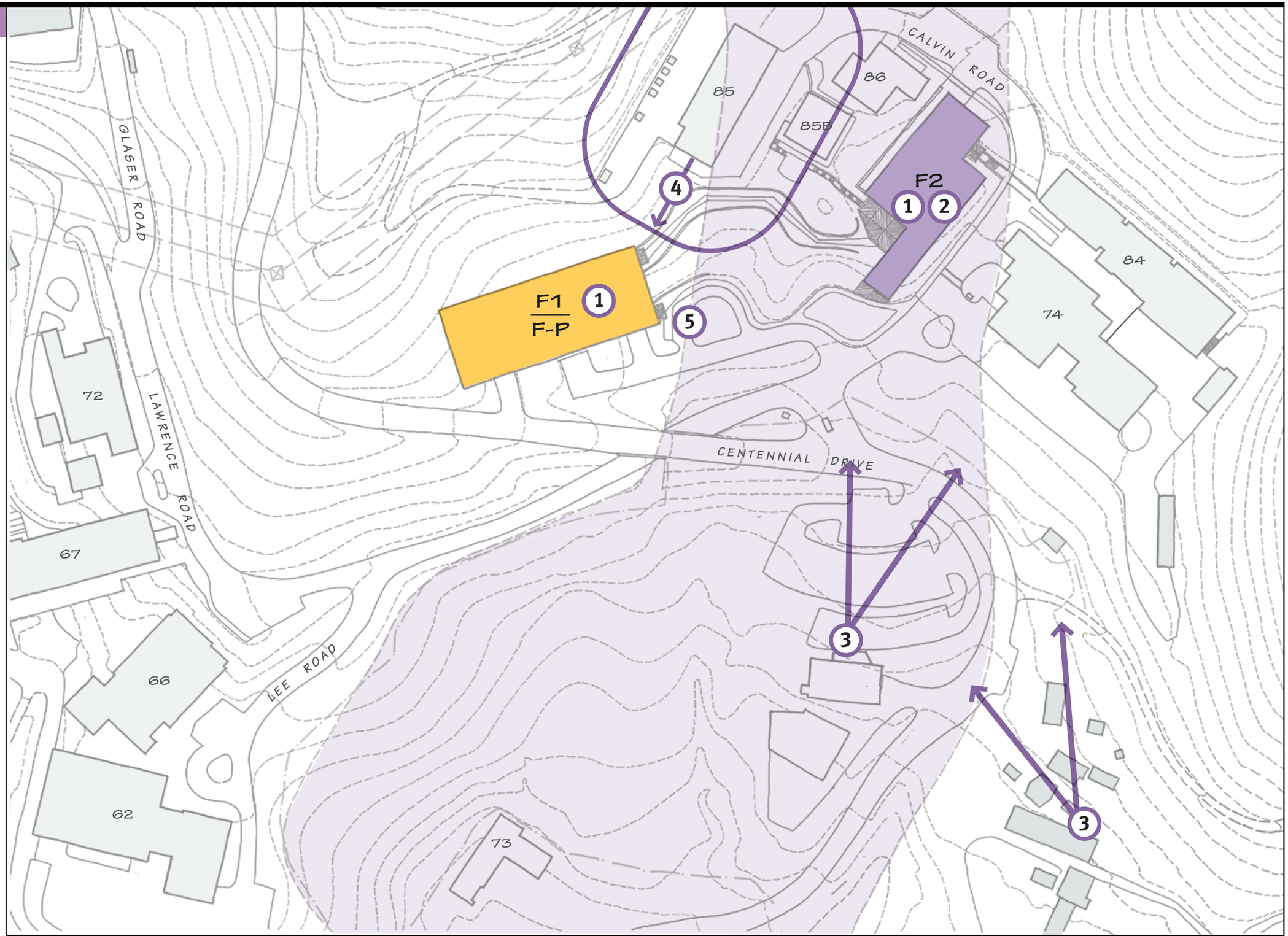




Foundry-Bio Study Area

Further Planning Considerations

1. The desired program for two 100,000 GSF buildings can only be met with a mix of office and lab floors, building a "high rise" (i.e., greater than 75-foot height), or building a fully submerged basement
2. Building F2 is in a landslide area; needs further study and costing
3. Further analyze views from UC Botanical Gardens at Berkeley and the city of Berkeley, considering tree screening and building heights
4. Verify required distance of Buildings F1 and F2 from Building 85 (Part B Permit)
5. Shuttle stop location could be moved to a new drop-off at Building F1, utiliziing vertical circulation to Buildings F2, 74 & 84

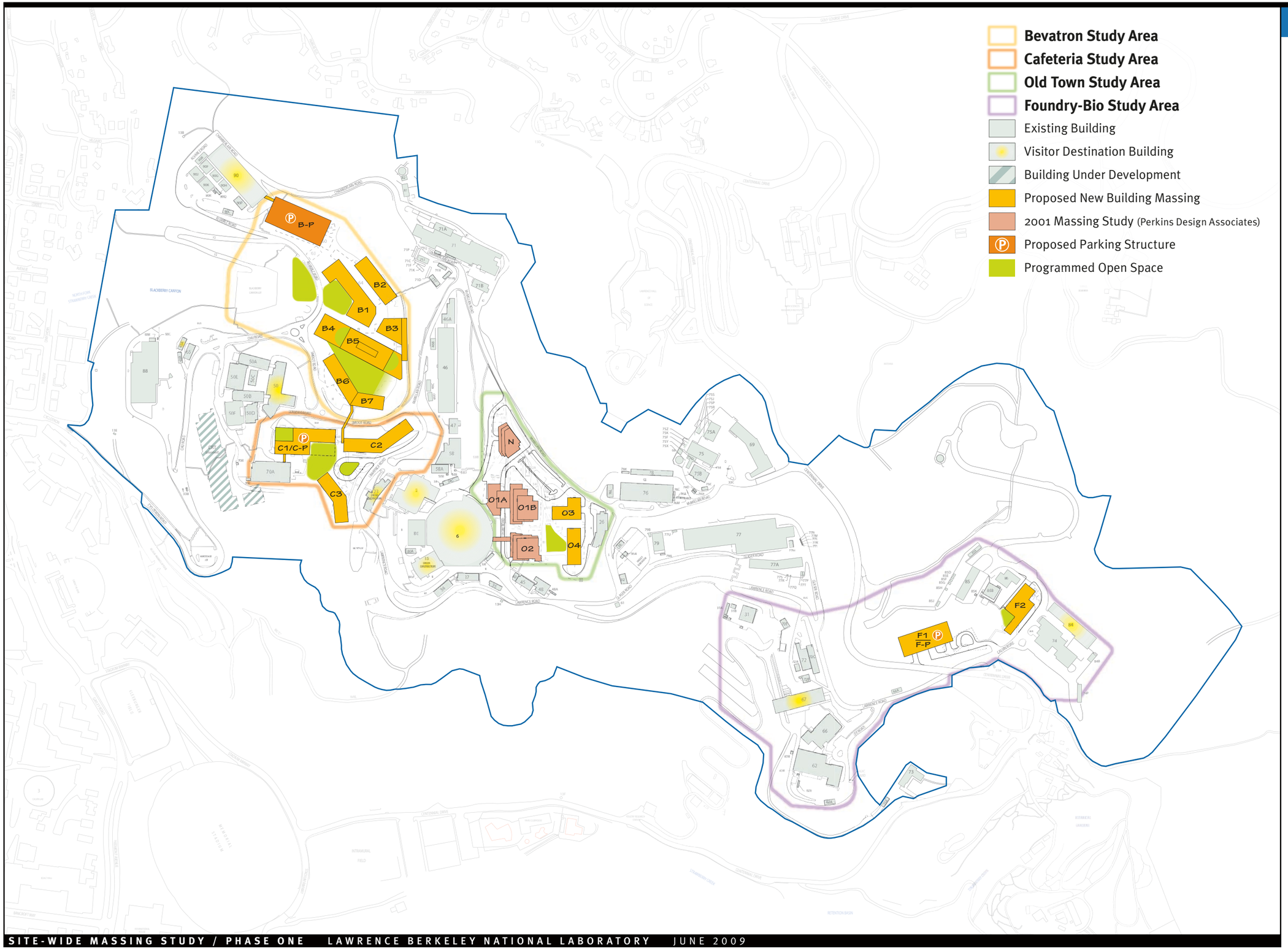


U.C. GRID NORTH
TRUE N
16° 43'

0 50' 100'
0 10 20 30m

Site-Wide Studies

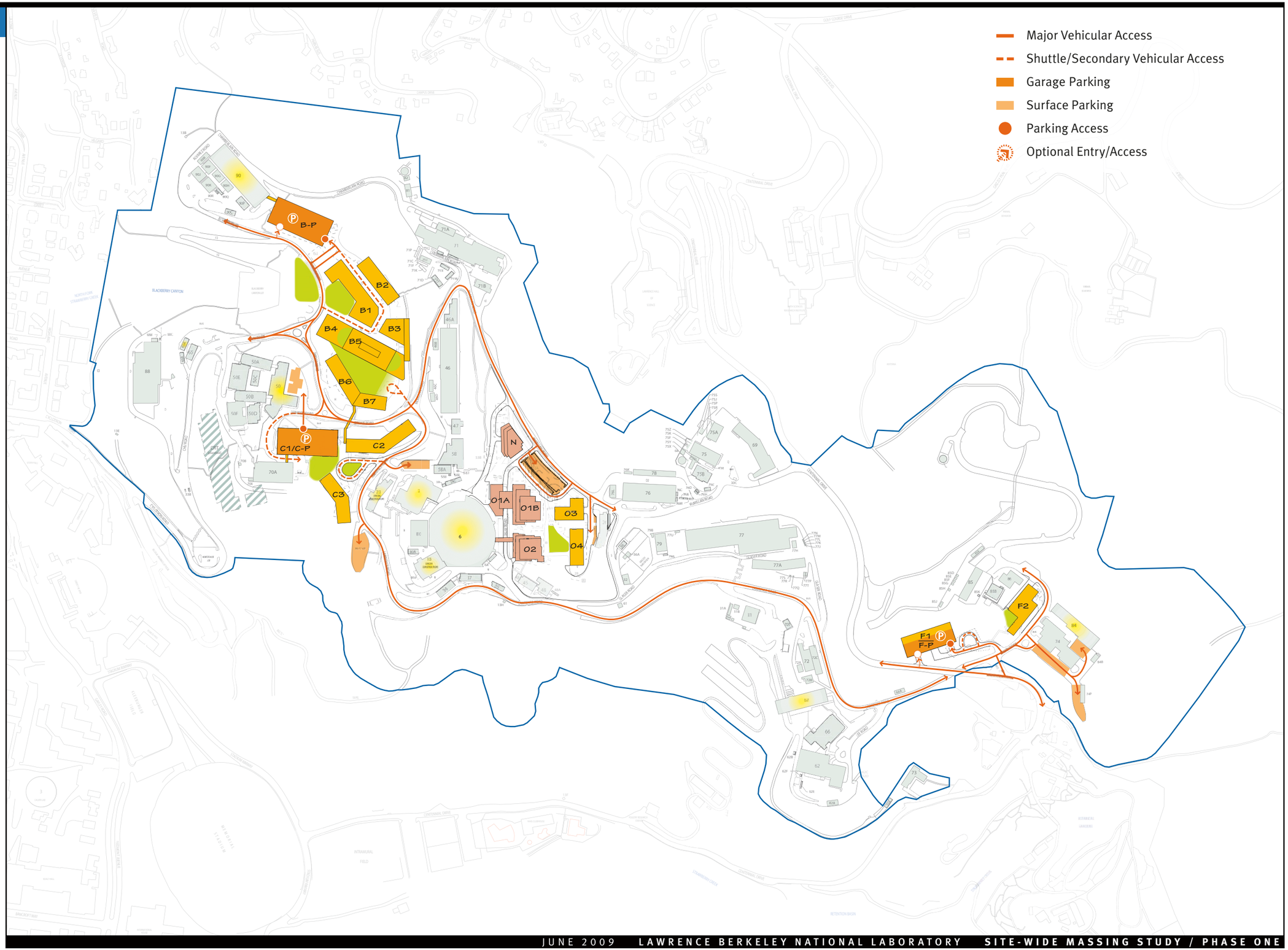
Study Areas and Proposed Massing



6.2

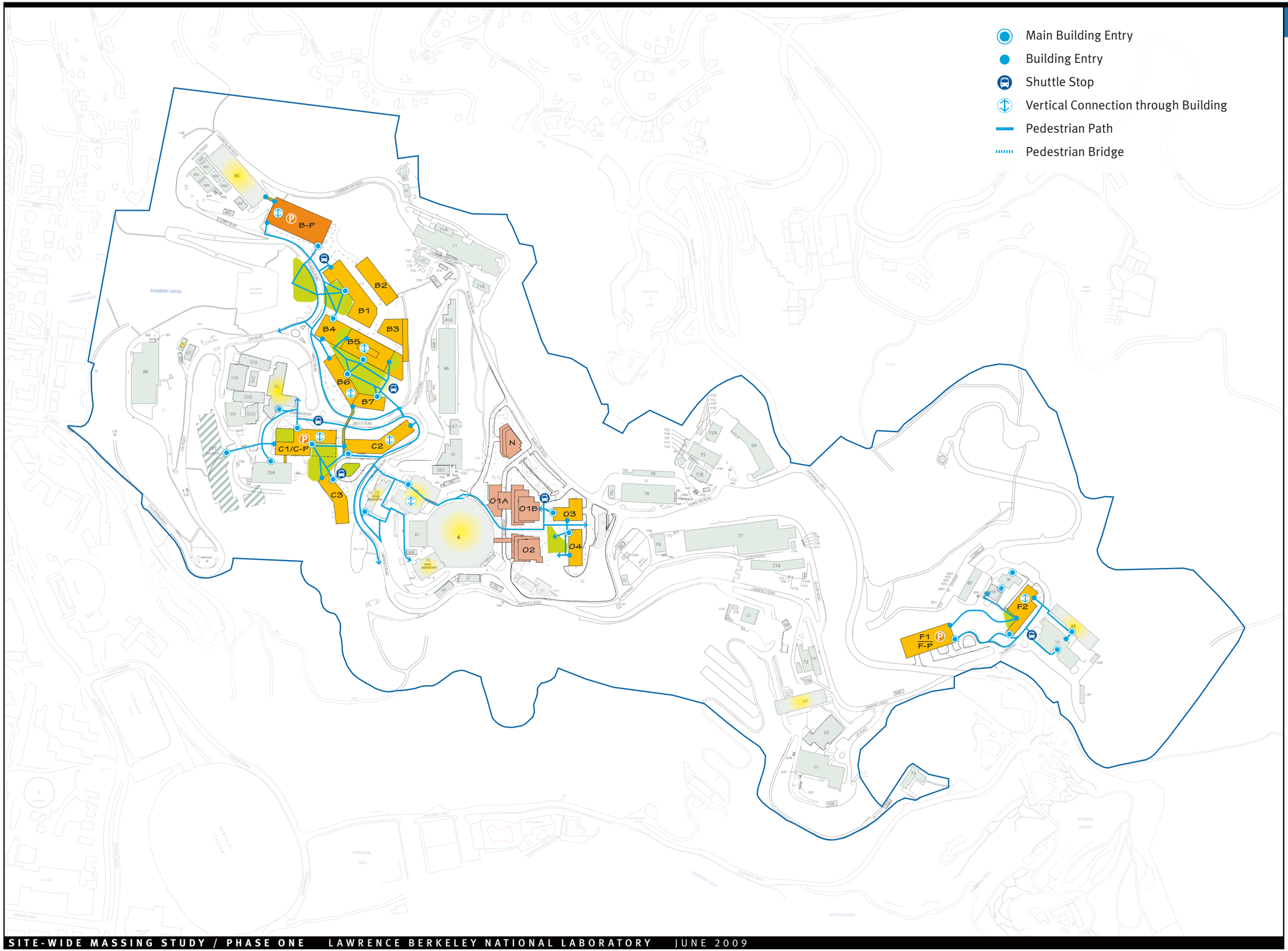
Site-Wide Studies

Vehicular Circulation



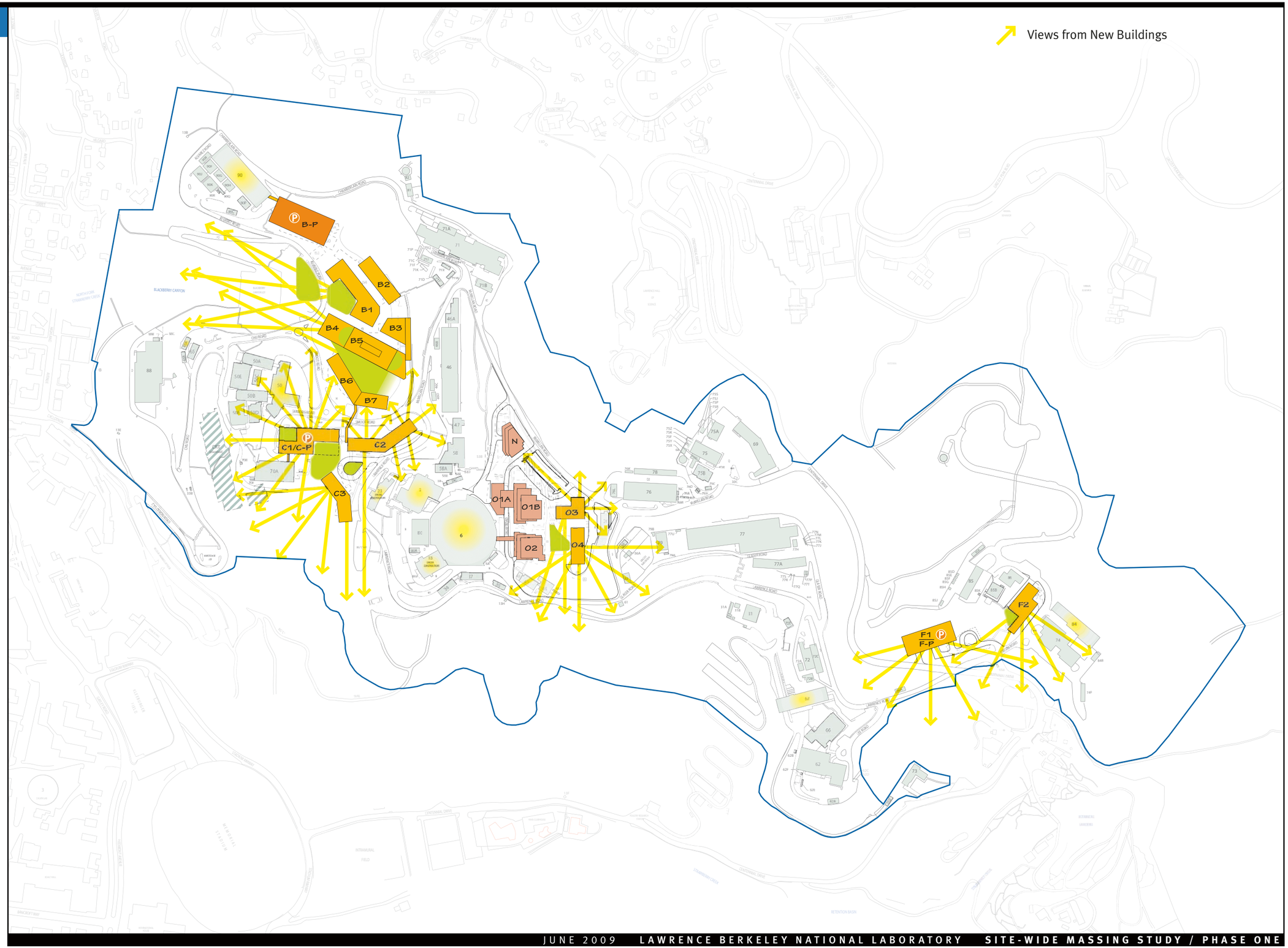
Site-Wide Studies

Pedestrian Circulation



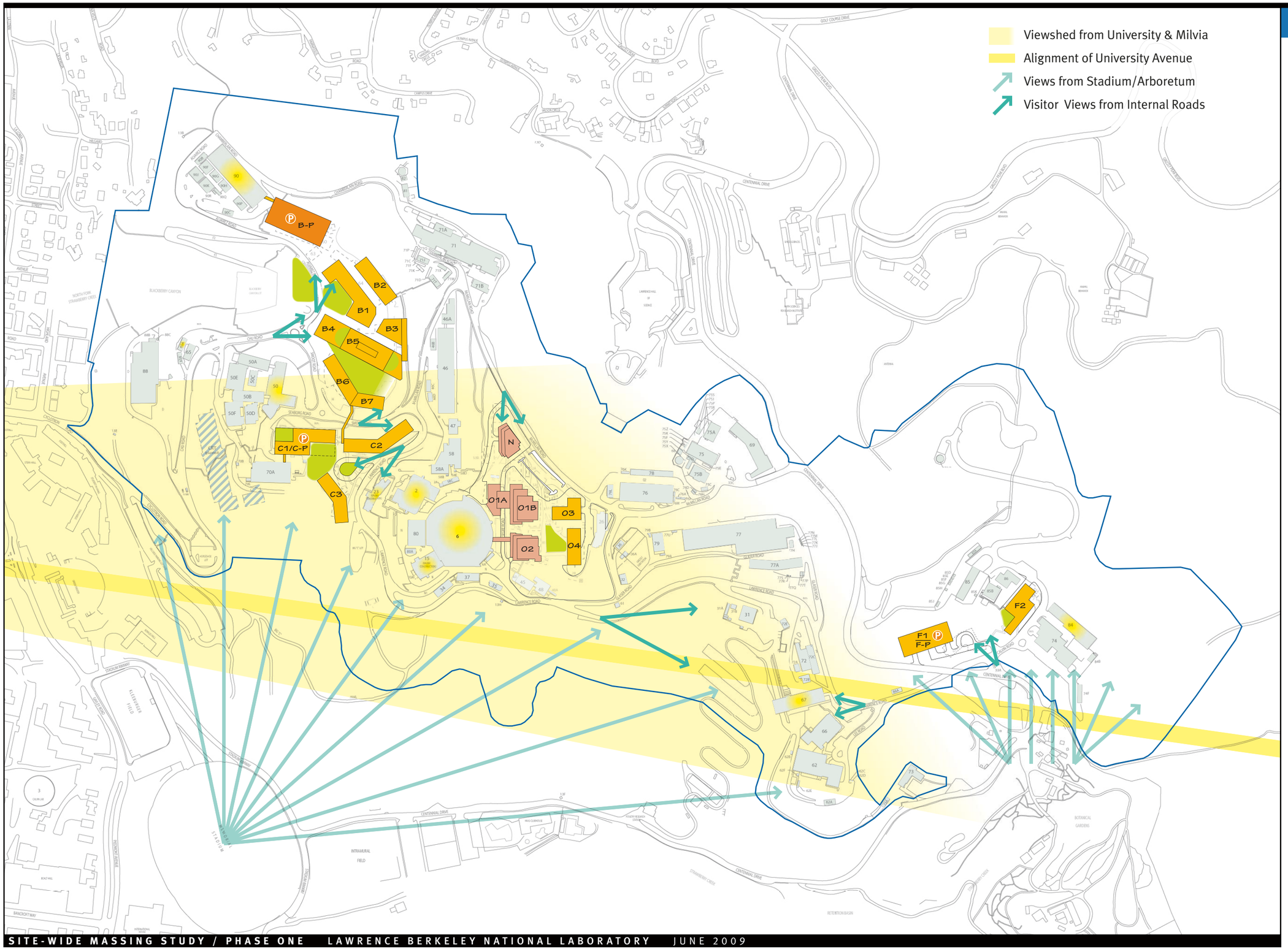
Site-Wide Studies

Views from Proposed Buildings



Site-Wide Studies

Views of Proposed Buildings



SITE-WIDE MASSING STUDY / PHASE ONE LAWRENCE BERKELEY NATIONAL LABORATORY JUNE 2009

6.6

Site-Wide Studies

Service Access

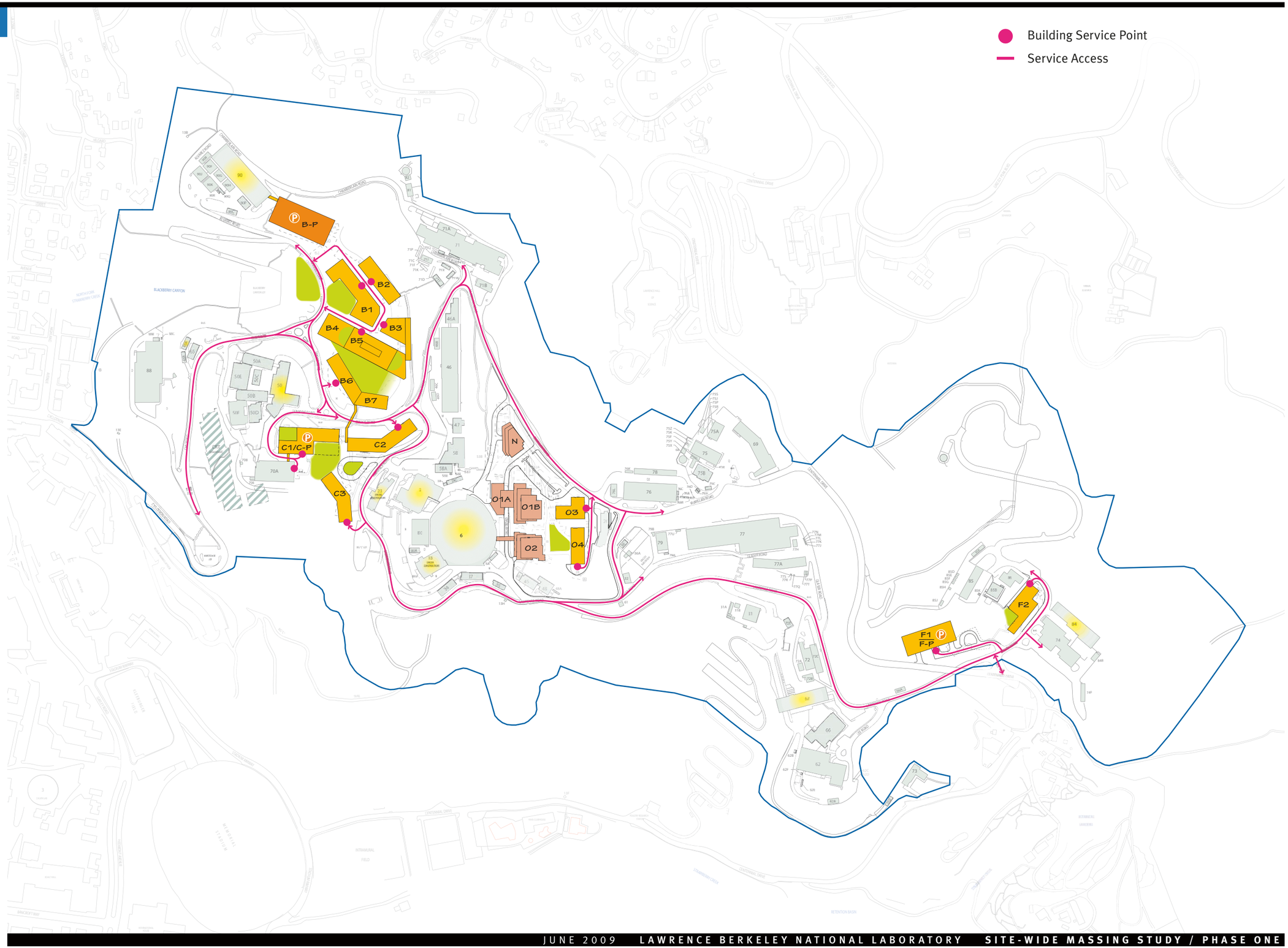


Table 1: Gross Square Footage / All lab floors

Bevatron Site All lab floors (floor-to-floor = 18ft)

Bldg	Potential Use	Floors	FFE[1]	Height[2]	GSF[3] / Floor	Total GSF
B1	Office/Lab	5	710	72	29,000	145,000
B2	BLASER[4]	1	710	0	16,500	16,500
B3	BLASER[4]	1	710	0	15,500	15,500
B4	BLASER[4]	3	710	36	51,000	153,000
B5	Office/Lab	2	768	72	22,000	44,000
B6	Office/Lab	5	714	72	15,000	75,000
B7	Office/Lab	5	750	72	9,500	47,500
					BLASER[4] GSF	185,000
					Office/Lab GSF	264,000
					Total GSF	**449,000**
Parking					Spaces / Floor	Total Spaces
BP	Parking	6	707	60	105	**630**

Cafeteria Site All lab floors (floor-to-floor = 18ft)

Bldg	Potential Use	Floors	FFE[1]	Height[2]	GSF[3] / Floor	Total GSF
C1	Office/Lab	3	790	66	24,000	72,000
C2	Office/Lab	5	777	72	22,500	112,500
C3	Cafeteria/Conference/Office	5	772	72	16,000	80,000
					Total GSF	**264,500**
Parking					Spaces / Floor	Total Spaces
CP	Parking	3	760	20	105	**315**

Old Town Site All lab floors (floor-to-floor = 18ft)

Bldg	Potential Use	Floors	FFE[1]	Height[2]	GSF[3] / Floor	Total GSF
O1A	Office/Lab[5]	2	880	18		*see O1B*
O1B	Office/Lab[5]	4	898	54		80,000
O2	Office/Lab[5]	5	880	72		54,000
N	Office/Lab[5]	3	892	36		26,800
O3	Office/Lab	4	934	54	11500	46,000
O4	Office/Lab	4	934	54	11250	45,000
Parking					Total GSF	**251,800**
P	Surface Parking				Total Spaces	**78**

Foundry-Bio Site All lab floors (floor-to-floor = 18ft)

Bldg	Potential Use	Floors	FFE[1]	Height[2]	GSF[3] / Floor	Total GSF
F1	Office/Lab	3	840	66	25,000	75,000
F2	Office/Lab	5	822	72	17,000	85,000
					Total GSF	**160,000**
Parking					Spaces / Floor	Total Spaces
FP	Parking[6]	3	810	20	40	**120**

Table 2: Gross Square Footage / Mixed office & lab floors

Bevatron Site Mixed office (12ft) & lab (18ft) floors (1:1)

Bldg	Potential Use	Floors	FFE[1]	Height[2]	GSF[3] / Floor	Total GSF
B1	Office/Lab	5	710	72	29,000	145,000
B2	BLASER[4]	1	710	0	16,500	16,500
B3	BLASER[4]	1	710	0	15,500	15,500
B4	BLASER[4]	3	710	36	51,000	153,000
B5	Office/Lab	3	768	72	22,000	66,000
B6	Office/Lab	6	714	72	15,000	90,000
B7	Office/Lab	6	750	72	9,500	57,000
					BLASER[4] GSF	185,000
					Office/Lab GSF	330,000
					Total GSF	**515,000**
Parking					Spaces / Floor	Total Spaces
BP	Parking	6	707	60	105	**630**

Cafeteria Site Mixed office (12ft) & lab (18ft) floors (1:1)

Bldg	Potential Use	Floors	FFE[1]	Height[2]	GSF[3] / Floor	Total GSF
C1	Office/Lab	4	790	72	24,000	96,000
C2	Office/Lab	6	777	72	22,500	135,000
C3	Cafeteria/Conference/Office	6	772	72	16,000	96,000
					Total GSF	**327,000**
Parking					Spaces / Floor	Total Spaces
CP	Parking	3	760	20	105	**315**

Old Town Site Mixed office (12ft) & lab (18ft) floors (1:1)

Bldg	Potential Use	Floors	FFE[1]	Height[2]	GSF[3] / Floor	Total GSF
O1A	Office/Lab[5]	2	880	18		*see O1B*
O1B	Office/Lab[5]	4	898	54		80,000
O2	Office/Lab[5]	5	880	72		54,000
N	Office/Lab[5]	3	892	36		26,800
O3	Office/Lab	5	934	60	11500	57,500
O4	Office/Lab	5	934	60	11250	56,250
Parking					Total GSF	**274,550**
P	Surface Parking				Total Spaces	**78**

Foundry-Bio Site Mixed office (12ft) & lab (18ft) floors (1:1)

Bldg	Potential Use	Floors	FFE[1]	Height[2]	GSF[3] / Floor	Total GSF
F1	Office/Lab	4	840	72	25,000	100,000
F2	Office/Lab	6	822	72	17,000	102,000
					Total GSF	**202,000**
Parking					Spaces / Floor	Total Spaces
FP	Parking[6]	3	810	20	40	**120**

Notes

1 FFE = Finish floor elevation

2 Height = Height from outside ground elevation to the highest finish floor elevation

3 GSF = Gross square footage

4 BLASER = Berkeley Laser Array for Science and Energy Research

5 Floor programming of buildings from 2001 Massing Study is undetermined

6 Parking structure requires a speed ramp

Site-Wide Studies

Data Tables: Proposed New Buildings

Notes

1 FFE = Finish floor elevation, each floor

2 BLASER = Berkeley Laser Array for Science and Energy Research

3 Buildings from 2001 Massing Study used various floor heights, as shown

4 Parking structure requires a speed ramp

Table 3: Finish Floor Elevations / All lab floors

Bevatron Site All lab floors (floor-to-floor = 18ft)

Bldg	Potential Use	Floors	Height	FFE[1]	1st	2nd	3rd	4th	5th	6th
B1	Office/Lab	5	18	710	728	746	764	782		
B2	BLASER[2]	1	30	710						
B3	BLASER[2]	1	30	710						
B4	BLASER[2]	3	18	710	728	746				
B5	Office/Lab	2	18	768	786					
B6	Office/Lab	5	18	714	732	750	768	786		
B7	Office/Lab	5	18	750	768	786	804	822		
BP	Parking	6	10	707	717	727	737	747	757	

Cafeteria Site All lab floors (floor-to-floor = 18ft)

Bldg	Potential Use	Floors	Height	FFE[1]	1st	2nd	3rd	4th	5th	6th
C1	Office/Lab	3	18	790	808	826				
C2	Office/Lab	5	18	777	795	813	831	849		
C3	Cafeteria/Conference/Office	5	18	772	790	808	826	844		
CP	Parking	3	10	760	770	780				

Old Town Site All lab floors (floor-to-floor = 18ft)

Bldg	Potential Use	Floors	Height	FFE[1]	1st	2nd	3rd	4th	5th	6th
O1A	Office/Lab[3]	5	20, 14, 16, 16	882	902	916	932	948		
O1B	Office/Lab[3]	4	21, 16, 16, 16	895	916	932	948			
O2	Office/Lab[3]	5	20, 26, 12	886	906	920	932			
N	Office/Lab[3]	3	16	892	908	924				
O3	Office/Lab	4	18	934	952	970	988			
O4	Office/Lab	4	18	934	952	970	988			

Foundry-Bio Site All lab floors (floor-to-floor = 18ft)

Bldg	Potential Use	Floors	Height	FFE[1]	1st	2nd	3rd	4th	5th	6th
F1	Office/Lab	3	18	850	868	886				
F2	Office/Lab	5	18	822	840	858	876	894		
FP	Parking[4]	3	10	820	830	840				

Table 4: Net Parking Spaces

Bevatron Site

Type	Lost	Gained	Net
Surface	324	0	-324
Garage	0	630	+630
		Net Total	**+306**

Cafeteria Site

Type	Lost	Gained	Net
Surface	219	0	-219
Garage	0	315	+315
		Net Total	**+96**

Old Town Site

Type	Lost	Gained	Net
Surface	207	78	-129
Garage	0	0	+0
		Net Total	**-129**

Foundry-Bio Site

Type	Lost	Gained	Net
Surface	53	0	-53
Garage	0	120	+120
		Net Total	**+67**

Site-Wide Total

Type	Lost	Gained	Net
Surface	803	78	-725
Garage	0	1065	+1065
		Net Total	**+340**

Future Project Phasing

Next Steps

Phase 2 of the Site-Wide Massing Study will enable LBNL to make site development decisions based on a comprehensive understanding of site opportunities and challenges. Each step will move the Lab towards a master plan document to guide future development.

1. Define overall document organization and content
2. Expand massing study efforts to include all potential site development areas
3. Increase detailing of all areas (pre-design) to include costing, preliminary programming, tree screening, view corridors, and further refinements to building heights and square footage
4. Develop perspective drawings to illustrate potential development scenarios and building façade articulations
5. Develop 3-D modeling of proposed new development to assess views to and from the Lab.
6. Develop campus-wide circulation, landscaping, utilities, and stormwater management strategies
7. Develop building and landscape materials standards
8. Prepare CAD drawings of proposed new buildings, circulation, and open space for use by the Lab for on-going planning and future studies

Acknowledgments

The Site-Wide Massing Study Phase 1 document was prepared by the Facilities Division, Lawrence Berkeley National Laboratory, University of California, with guidance from laboratory management and staff.

Facilities Division Staff
Jennifer Ridgeway, Facilities Division Director
Laura Chen, Chief Facilities Planner

Consultant Team
Sue Labouvie, Studio L'Image
Max Heim, Studio L'Image
Robert Sabbatini AICP ASLA
Jantrue Ting

Contributors

Science & Engineering
Paul Alivisatos, LBNL Director (interim)
Peter Denes, Engineering Division
Russell Wells, BLASER Engineer
Chris Yetter, Chief of Staff

Facilities & Operations
Fred Angliss, Structural Engineer
Steve Blair, Civil Engineer
Tammy Brown, Shuttle Services
Janice Cheung, Deputy Fire Marshal
Jim Krupnick, Chief Operating Officer
Jeff Philliber, Facilities Environmental Planner
Gary Piermattei, Fire Marshal

Ernest Orlando Lawrence Berkeley National Laboratory
1 Cyclotron Road
Berkeley, CA 94720
510-486-4000

First Printing — 06.05.2009